FirePro®

INFORMATION, INSTRUCTION & USER MANUAL

Version 4, 01-05-2010

Fire Extinguishing Aerosol Systems

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Preamble

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Limited guarantee

Limited manufacturer's guarantee

Celanova Ltd. and FirePro Systems Ltd. guarantee that **FirePro®** products will basically function in accordance with the associated documentation.

No other guarantee

Celanova Ltd. and FirePro Systems Ltd. and its distributors give no other guarantee, either express or implicit, including but not limited to an implicit guarantee regarding marketability or suitability for a given purpose, in relation to **FirePro®** products and the associated documentation.

Modifications to the product

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Trademarks.

FirePro® and Celanova are registered trademarks of Celanova Ltd. of Limassol, Cyprus. All other business or product names are trademarks, registered trademarks or service marks of their respective owners.

Patents.

FirePro® is a registered European and Canadian patent of Celanova Ltd. of Limassol, Cyprus. Infringement of this patent, however called, shall be pursued using the legal remedies available for this purpose.

Information about regulations

European Directives

Products as referred to in this manual with the CE mark meet the Directive for stationary dry aerosol-based extinguishing components (EMC Directive 89/336/EEC). The components also meet the testing requirement BRL-K23001/03 under a certificate issued by KIWA NV under accreditation.

Reference to the standards below is made in the above testing requirement and in this information, instruction, and user manual.

NEN-EN-5509 (1998)	: user manuals – content, structure, formulation and presentation
EN-45011 (1998)	: product certification - systems
EN-45012 (1998)	: certification/registration – quality systems
EN-45013 (1998)	: certification of persons (NEN-EN-ISO/IEC 17024:2003 en)
EN-45004 (1998)	: inspection bodies (NEN-EN-ISO/IEC 17020:2004)
NEN-EN-1050 (1997)	: principles for risk assessment
NEN-EN-2535 (1996) and 2535a (2002)	: fire safety of buildings – fire detection installations – system and quality requirements and guidelines for detector siting
NEN-EN-54 (2004)	: automatic fire extinguishing systems (parts 1 to 14)
NEN-1010 (2003)	: safety requirements for low voltage installations
NEN-6082 (1997)	: fire compartments and escape routes
NEN-2654 (2002)	: management, control and maintenance of fire safety systems
NEN-2575 (2004)	: fire safety of buildings – evacuation alarm installations - system and quality requirements and guidelines for locating of alarm devices

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1.0 Introduction

1.1 Foreword

FirePro® aerosol fire extinguishers and fire extinguishing systems are designed to control and/or extinguish a fire. The authors have arranged this information, instruction and user manual so that consideration has been given to all the important aspects for a functional installation. A demonstrably functional installation of **FirePro®** fire extinguishing systems requires this manual to be followed closely. This manual is the result of collaboration with the manufacturer Celanova Ltd./FirePro Systems Ltd., CFS Research & Development, TNO and KIWA.

The information, instruction and user manual is designed for experts and consultants who are involved in any way in the design, installation, delivery and aftercare of **FirePro®** aerosol fire extinguishers and aerosol fire extinguishing systems. The information, instruction and user manual must be used in conjunction with BRL K23001 and BRL K23003 of KIWA Certification & Inspections and in conjunction with European aerosol standards. The knowledge level of the various users must be adapted to their background.

For correct interpretation the 'Certified Authorized Technical Technician Aerosol Systems' training (CATTAS training), which covers the aspects referred to in this document, must be followed as a minimum. The electrical installations referred to in this information, instruction and user manual, such as fire detection, control and alarm systems, must be installed by specially trained personnel of the supplier of the systems concerned. These aspects are not therefore covered in this information, instruction and user manual. In the event of improper use of this manual, neither manufacturer nor distributor nor dealer can bear any responsibility.

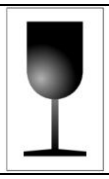
1.2 Normative References

The standards referred to in this information, instruction and user manual contain provisions, which because reference is made to them, are also provisions of this document. At the time of publication of this document the editions referred to were in force. However, all standards are subject to revision; parties concluding agreements on the basis of this document are therefore advised to check whether it is possible to apply the most recent edition of standards referred to in this document.

1.3 Safety Instructions

This information, instruction and user manual contain preventive measures and safety instructions for carrying out the necessary operations safely. The following may serve as a list of the term "operations" in the different phases of the product: transport, reception, storage, assembly, placing of product, mounting and/or installation, treatment and/or use, maintenance, visual examination, repair, decommissioning, dismantling, removal, disposal, waste, health, safety and environment.

Pictograms used for prohibitions, commands and warnings in this document are:

PROHIBITION					
	Important	**Open fire prohibited**	**Smoking prohibited**	**Switch off**	**Switch on**
COMMAND					
	Important !	**Eye protection**	**Head protection**	**Hand protection**	**Disconnect**
WARNING					
	Warning	**Fall risk**	**Hot surface**	**Damage**	**Breakable**

1.4 Aerosol Designations

The need for an explanation of the correct terms or designations and the behaviour of aerosol emerged during the development of aerosol-based extinguishing systems. In this explanation we would like to consider this matter so that clearer terms can be used in for example presentations of the extinguishing system. We shall therefore consider the parts systematically.

Aerosol
An aerosol is a *colloidal dispersion* in a gas.

Aero / Sol
Air / Colloidal solution

Colloids
Particles measuring from a few micrometres (10^{-6} m) to a few nanometres (10^{-9} m) that are suspended in another substance or gas without actually being dissolved in it. If colloids are dispersed in a solution, we have a *colloidal solution* or *sol*. The solvent is called *dispersion medium* or *continuous phase*. In the case of an aerosol extinguishing agent such as **FirePro®** the solvent is the air around us.

Dispersion
The distribution of a substance is called *dispersal* and the resulting product dispersion. A sol is consequently a colloidal dispersion in a solvent.

Potassium

Part of the solid compound of **FirePro®** consists of potassium. Potassium is a chemical element (a very soft metal with a silvery lustre).

1. History and name

Potassium was first isolated by Davy in 1807 through the electrolysis of molten potassium hydroxide (KOH), from which the name potassium is derived (see also alkali). At roughly the same time (1807 – 1808) Gay-Lussac and Louis Jacques Thenard obtained the element through the reduction of molten potassium carbonate with iron filings in an iron crucible.

2. Occurrence

With 2.59% potassium occupies seventh place in the list of most common elements in the earth's crust. In seawater it has an average concentration of 0.380 g per kg. It occurs in very many minerals and vegetable and living organisms (plants, animals, humans, etc, contain organic potassium salts).

3. Properties

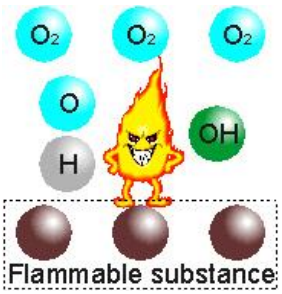
Potassium is an alkali metal. Apart from an inert gas configuration, the elements of this group, the alkali metals, have a single s electron that can easily be split off. Potassium consequently has a very simple, ionic chemistry.

4. Physiological significance in the human body

While it is mainly sodium salts (in particular ordinary kitchen salt) that are dissolved in tissue fluid, no sodium is found in the cells, but potassium salts. The amount of potassium in the body is connected to the amount of sodium. Potassium has an important part to play in living organisms. Important sources of potassium in food are: vegetables, fruit, potatoes, meat, bread and milk. An adult needs approx. 3,500 mg of potassium per day.

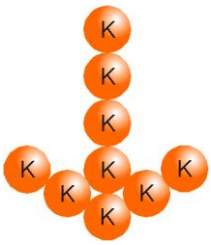
1.5 Action of Aerosol Extinguishing Agent

The overview below gives a brief description of the extinguishing action of ***FirePro®*** aerosol fire extinguishers and fire extinguishing systems.



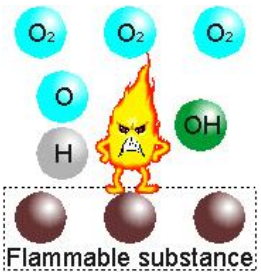
A minimum of three factors are needed for fire and they are:
- Oxygen
- A flammable substance
- An ignition temperature

Fire is nothing other than a chemical reaction in which the substances O, H and OH sustain the chain reaction.



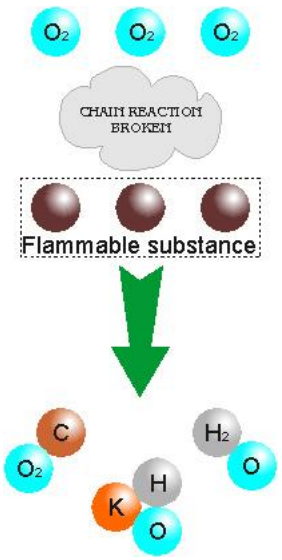
FirePro® will be activated electrically or by reaching 172 ºC, whereupon the thermocord will react.

The aerosol released contains potassium compounds that initiate both (A) a physical and (B) a chemical reaction with the fire.



Re A. Physical action

A certain amount of energy is needed for the chemical reactions to take place. The required amount of energy is supplied by the abundance of energy present in the flame.



Re B. Chemical action

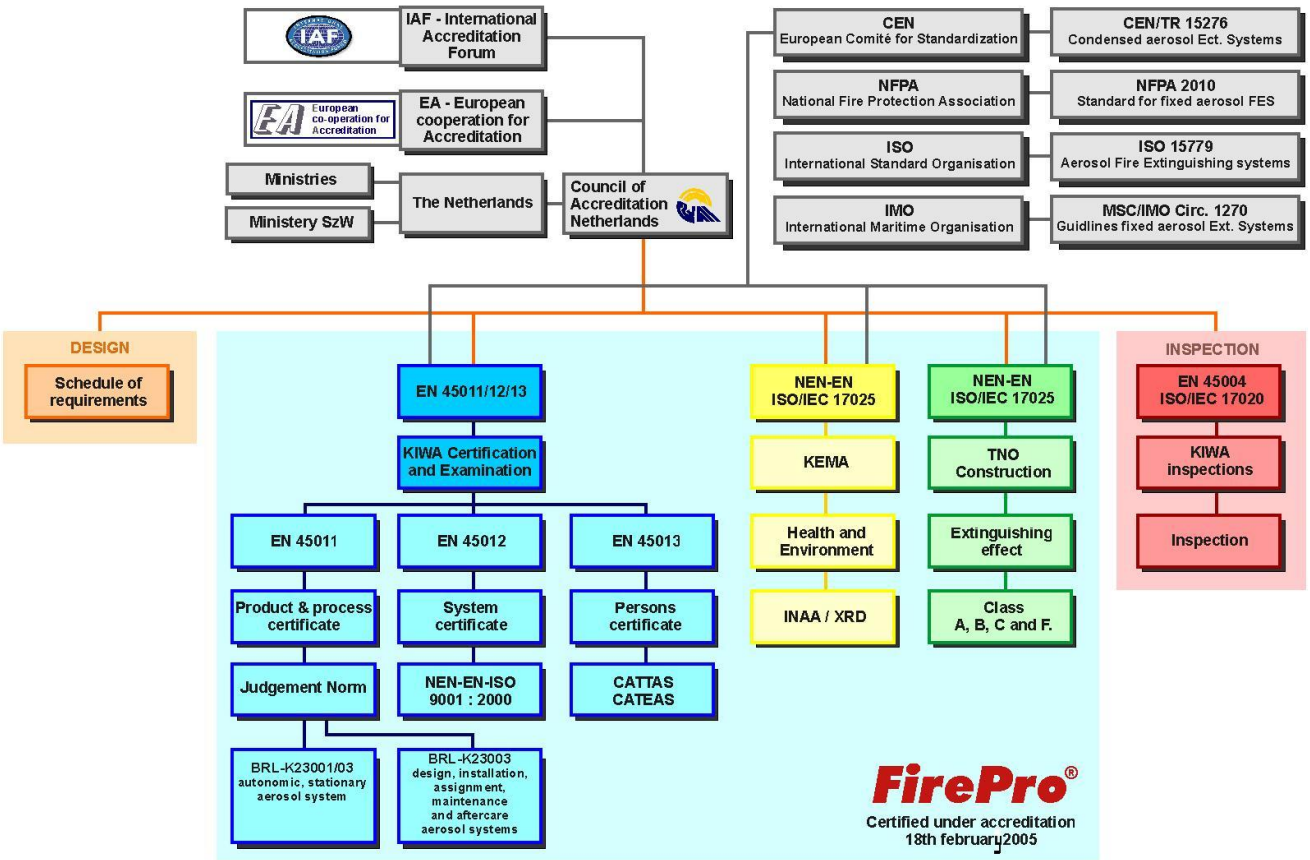
There are certain reactions between atoms and parts of unstable molecules (radicals), which take place in rapid succession in the flame during combustion.

Unstable radicals try to become stable and undergo a number of reactions. A hydroxide (OH) is an unstable radical that also provides for the chain reaction of fire.
The potassium obtained from the discharge of the potassium compounds reacts during combustion with the free radicals of unstable hydroxides and forms potassium hydroxide (KOH), which is a very stable compound. In this phase the chain reaction of the free radicals stops and the flame goes out.

There are also other reactions that take place during the extinguishing that ensure that the end product is not harmful to humans, environment and matter.

1.6 Certification and Testing

To attain certified products and processes it was decided, on the advice of the Ministry of the Interior and the European Community, to work according to EN-45011 (product and process certification), EN-45012 (system certification) and EN-45013 (person certification). The necessary tests have been carried out in cooperation with national and international accredited bodies. The chart below shows the process steps completed.



The ministries, organisations and institutes below have co-operated with the tests and/or certifications.

FSB – Fire Solutions Benelux
International Distributor
PO Box 1587
3260 BB Oud-Beijerland
Netherlands
Tel. +31 (0)186-699 699

Ministry of Housing, Spatial Planning & the Environment
PO Box 30945
NL - 2500 GX The Hague
Tel. +31 (0)70-339 4070

Council for Accreditation
PO Box 2768
NL - 3500 GT Utrecht
Tel. +31 (0)30-239 4500

KIWA Certification & Inspections
PO Box 70
NL - 2280 AB Rijswijk
Tel. +31 (0)70-414 4489

KEMA Nederland E.G.
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Tel. +31 (0)26-356 2225

TNO Bouw
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NL - 2600 AA Delft
Tel. +31 (0)15-284 2309

NIBRA
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Tel. +31 (0)26-355 2400

asbl ANPI vzw
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Parc scientifique Fleming
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Belgium
Tel. +32 (0)10-47 5243

Hughes Ass. Europe, srl
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I – 20017 RHO (Milan)
Tel. +39 02-9390 4340

Danish Maritime Authority
Søfartsstyrelsen
Vermundsgade 38C
DK - 2100 Copenhagen
Tel. +45 (0)39-17 4400

Maritime Fire Institute
DBI Dansk Brand- og Sikringsteknisk Institut
Jernholmen 12
DK - 2650 Hvidovre
Tel. +45 (0)36-34 9000

Nationaal Lucht-en Ruimtevaartlaboratorium
NLR Amsterdam
Anthony Fokkerweg 2
1059 CM Amsterdam
Tel. +31 20 511 3113

BSI Product Services
Kitemark House, Maylands Ave
Hemel Hempstead, HERTS HP2 4SQ
England
Tel. +44 8450 765 000

US EPA
United States Environmental Protection Agency
Ariel Rios Bldg, 1200 Pennsylvania Ave, NW
Washington DC 20460

Min. of Transport, Public Works & Water Management
Shipping Division
PO Box 8634
NL - 3009 AP Rotterdam
Tel. +31 (0)10-266 8500

ECB
Julianaweg 224A
NL - 1131 NW Volendam
Contact: P.A. van der Weide
Tel. +31 (0)299-323 123

Underwriters Laboraties of Canada
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Toronto, ON M1R 3B4
Canada
Tel. +1 416 757 3611

Ministero dell' Interno
Direzione Generale della protezione civile e dei servizi antincendi
Italy

Jednostka Certyfikująca Wyroby
Centrum Naukowo-Badawcze Ochrony
The Józef Tuliszkowski Scientific and Research Centre for Fire Protection.

Det Norske Veritas
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NL - 3007 AN Rotterdam
Tel. +31 (0)10- 292 2600

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Instytut Naukowo-Badawczy
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Tel. +48-49-4051

BRE Certification Ltd
incorporating LPCB
Bucknalls Lane,
GB - Garston, Watford
WD25 9XX
Tel. +44 (0)1923-664100

The Standards Institution of Israel
42 Chaim Levanon Street
IL - Tel Aviv 69977
Tel. +972-3-646 5154

Commonwealth Scientific & Technical Research Organisation
Australia
Tel. +61 3 9252 6000

1.7 Agreement Between the Councils for Accreditation

Source: www.rva.nl

RAAD VOOR ACCREDITATIE

The Council for Accreditation seeks the acceptance and honouring of accreditations not only nationally but also worldwide. In the case of applications for or consultation about acceptance of accreditations of other accreditation bodies, the Council for Accreditation will always take as its starting point that the accreditations must demonstrably be of equivalent quality level. This quality level is verified by means of international peer reviews. Accredited bodies receive an accreditation certificate showing the international cooperation. Equivalence at European and world level is underlined in this way.

MultiLateral Agreement (MLA)

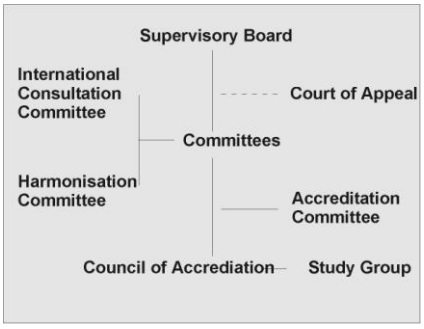
The MLA is an efficient means of gaining cross-frontier European and worldwide acceptance for goods and services. The primary MLA for the Council for Accreditation is that with other European accreditation bodies via the EA-MLA. This EA-MLA, in cooperation with the International Laboratory Accreditation Cooperation (ILAC-MLA) and the International Accreditation Forum (IAF-MLA), ensures that accreditation is a 'passport' for simplifying access to the European Union and international markets. The recognisability in the market of the MLA signatories and the bodies declaring conformity accredited by them is simplified by the use of ILAC and IAF logos together with the Council for Accreditation logo (as at end of 2004).

EA European co-operation for Accreditation ilac IAF

How does the MLA work?

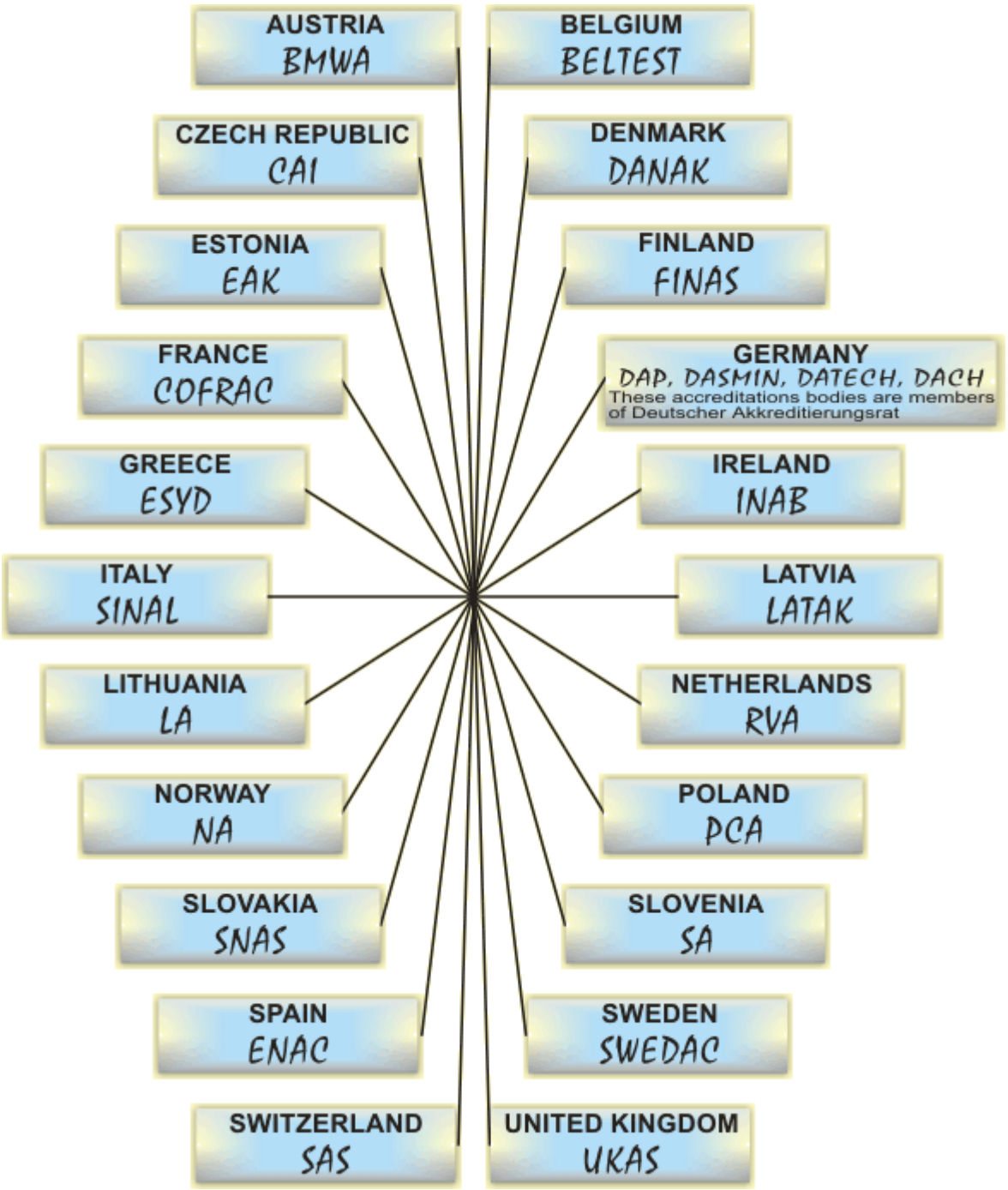
The MLA between accreditation bodies produces mutual confidence in and acceptance of accredited certifications, inspections, calibrations and tests. The MLA removes the need for providers of services and products to be certified in each country for example. Accreditation bodies that are signatories to an MLA are subject to a regular, intensive review by international peers. The purpose of these assessments is to establish that the accreditation body concerned meets and continues to meet the international requirements. These peer reviews guarantee consistent and harmonised accreditation practices and facilitate the sharing of information and experiences between the signatories.

The MLA is an important mechanism in cross-frontier accreditation. It is the policy of the Council for Accreditation to assist users of accredited conformity declarations with worldwide acceptance of these declarations.



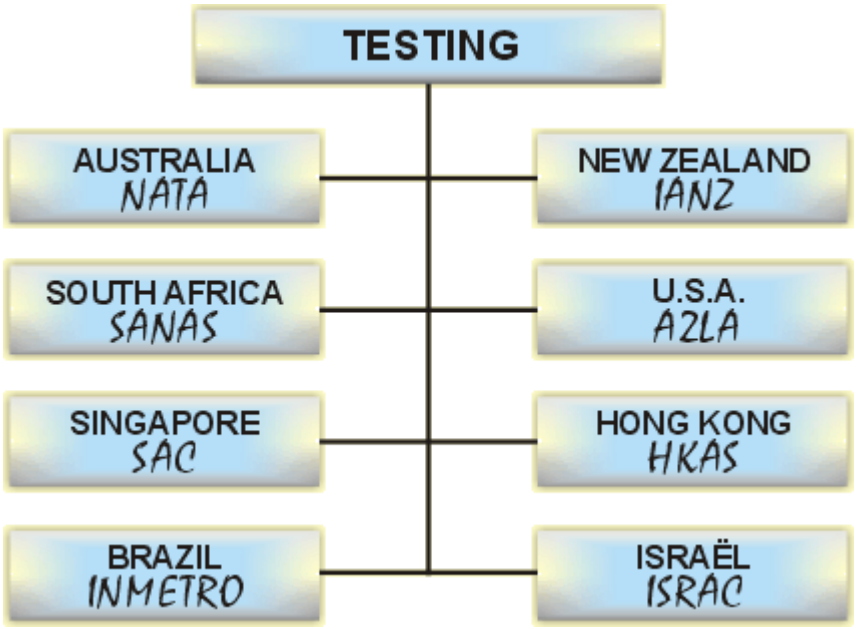
SIGNATORIES OF THE MLA FOR TESTING

(ILAC MRA, Bilateral agreements, address)
[Calibration] [Inspection] [Certification (products)] [EMS]
[Certification (quality systems)] [Certification (personnel)]



BILATERAL AGREEMENTS

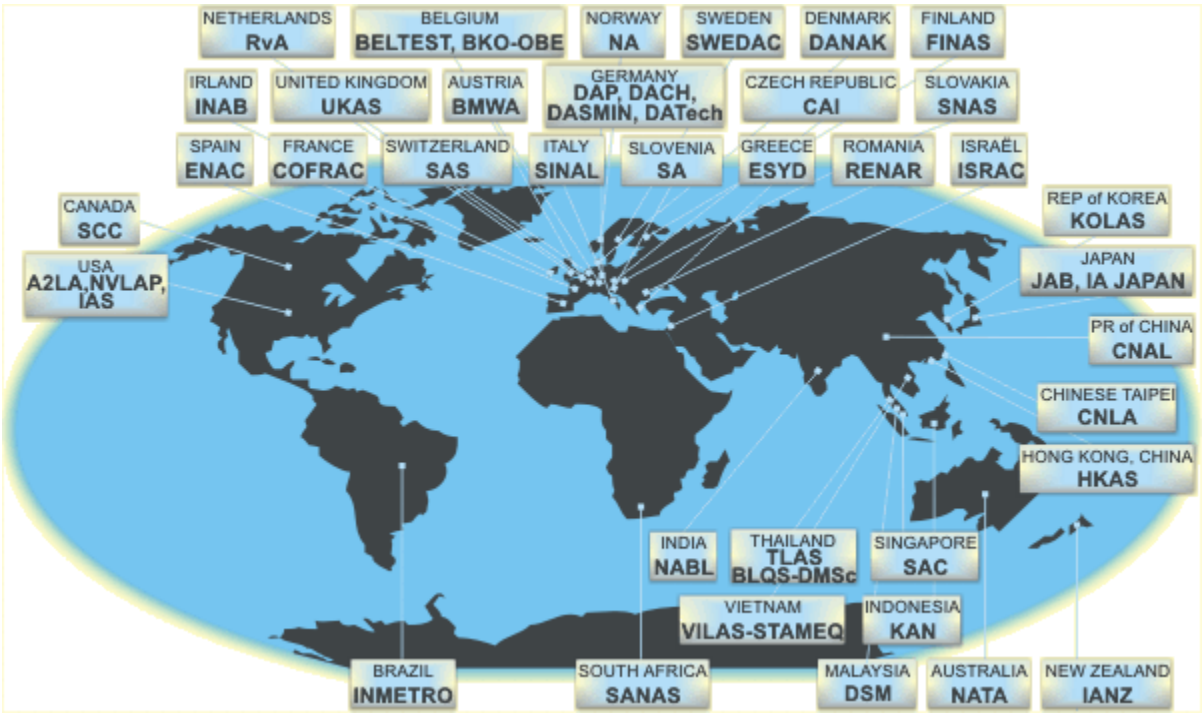
(MLA TESTING, ILAC MRA)



ILAC MRA TESTING

(MLA TESTING, Bilateral agreements)

on recognition and acceptance of tests and calibration results



The list of the signatories is available at:
www.ilac.org/downloads/Arrangement.pdf

1.8 KIWA Product Certificate

To attain European acceptance through accreditation there has been work on a structure based on the European standards. This is for product certification, process certification and person certification. These processes are now at an advanced stage and product certification is a fact. Under accreditation **FirePro®** products are for example subject to the tests described in testing requirement BRL K-23001/03. The following tests and inspections are among those to be found in the testing requirement:

Performance requirements and methods of determination
The stationary autonomous dry aerosol-based extinguishing components must extinguish objects of the respective fire class to be extinguished effectively.

Performance requirement for suspension system for fire extinguishing components
The care for adequate fixing of the extinguishing components in the room where extinguishing must be done.

Product requirements and methods of determination
This chapter contains the product requirements that the extinguishing components must meet and the methods of determination for establishing that the requirements are met.

Thermal ageing
The action of the product must have a life of 15 years.

Stability of extinguishing agent
The composition must be determined during the type tests and be registered.

Toxic aspects
The toxic aspects must meet the toxicological requirements and be determined.

Packaging, preservation, storage, identification
The packaging must be tailored to use. If special measures must be taken in connection with preservation, they must be stated in the instructions for use and on the packaging identification label. Storage must be in accordance with the instructions for use in connection with preservation requirements.

Installation and user manual
There shall be a clear user manual available in the language of the country of delivery.

Testing and control
This chapter contains the requirements for testing and control that are carried out for the certification.

Quality level requirements
This chapter contains the requirements that the supplier's quality system must meet.

Installation
The steps to be taken are described in BRL-K23003. The following are among the steps to be found in it:

Design phase:	Schedule of Requirements (design of extinguishing system, structural provisions, fire detection, ventilation, transmission of fire, fault, etc).
1st inspection phase:	Control of Schedule of Requirements by inspection body (ISO and EN 45004, type A).
Testing phase:	By requiring parties (Fire Service, Environment, Insurer, etc).
Any adjustments:	Detail engineering (installation drawing, function matrix, block diagram, extinguishing agent required, tool life, etc).

2nd inspection phase: Control of detail engineering by inspection body.

Installation phase: Installation by CATTAS-trained personnel on the basis of installation drawing, manual and standards.

Delivery: Delivery of the installation (statement of delivery).

Final inspection phase: Control by accredited body (issue of certificate).

A complete breakdown of all the requirements and the testing and inspection methods can be found in the testing requirements, obtainable from KIWA NV in Rijswijk.

Certificate

kiwa
Partner for progress

Number	K21477/08	Replaces	K21477/07
Issued	2010-04-01	Dated	2001-11-01
Valid until	2015-04-01		

Product certificate

FirePro fixed fire extinguishing components based on dry condensed aerosol

Based on pre-certification tests as well as periodic inspections by Kiwa, the products referred to in this certificate and marked with the Kiwa-mark as indicated under 'Marking', supplied by

FirePro Systems Ltd.

may, on delivery, be relied upon to comply with the Kiwa evaluation guideline BRL-K23001; 2004-11-30 "Fixed fire extinguishing components based on dry condensed aerosol".

B. Meekma

Bouke Meekma
Director Kiwa N.V.

This certificate is issued in accordance with the Kiwa-Regulations for Product Certification.

This certificate consists of 5 pages.
Publication of the certificate is allowed.

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1.9 CE Declaration of Conformity

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Telephone : 00357-25-379999
Telefax : 00357-25-354432
E-mail : mail@firepro.info

Statement of conformity (II-A)

We, FirePro Systems Ltd herewith declare on our responsibility that the product FirePro® including the types FP-8, FP-20E, FP-20S, FP-40S, FP-80, FP-80S, FP-100S, FP-200S, FP-200M, FP-500S, FP-1000M, FP-1200, FP-2000, FP-3000 and FP-5700, whereto this statement refers, is in conformity to the EMC directives 89/336/EEG and other normative documents following the definitions of the BRL-23001/03 made up by KIWA Nederland. The BRL-23001/03 is also basis for the operating schedule Factory Production Control.

Cyprus,
Limassol, 1st May 2010

A. Avgousti
Managing Director

FirePro Systems Ltd. Page 1 of 1

1.10 Test Institutes Worldwide

Part	Countries	No.	Description
A	Australia (& New Zealand)	1.	ActiveFire – Active Fire Protection Equipment Listing Scheme (CSIRO).
	Austria	1.	STP, Sicherheitstechnische Prüfstelle.
B	Belgium	1.	ANPI - Inspections and Certifications.
C	Cyprus	1.	The Ministry of Justice and Public Orders, Chief Fires offices Fire Department, Cyprus.
	Canada		ULC – Underwriters Laboratories of Canada.
D - E	Denmark	1.	Danish Maritime Authority.
		2.	Danish Fire- and Securing Technical Institution (DBI).
F - G	Greece	1.	Ministry of Interior and Public Orders, Commission of Fire Brigades, Greece.
		2.	The Standards Institution of Greece.
H - I	Hungary	1.	Ministry of Interior, BM TOP Fire Protection Training Institution, Fire Protection Test Laboratory, Budapest, Hungary.
		2.	Award of Budapest.
J - L	Israel	1.	The Standards Institution of Israel.
		2.	The Ministry of Environment of Israel & Standards Institution of Israel.
	Italy	1.	Ministry of Interior, General Directorate of Civil Protection and Fire Fighting Services, Italy.
		2.	Chemical Analysis-University of L'AQUILA, Department of Chemistry, Chemical Engineering and Materials, Italy.
		3.	RINA, Registry of Italian Navy, Italy.
		4.	CESI, Italian Electro technical Centre of Experiments, Italy.
		5.	Italian Register of Chemical Scientists, Italy.
M - O	Netherlands	1.	ECB, European Certification Bureau.
		2.	Ministry of Transport, Public Works and Water Management/Internal Documents Lakeman.
		3.	KIWA. EU certification EN-45011, EN-45012, EN-45013
		4.	KEMA.
		5.	TNO.
		6.	Ministry of Housing, Spatial Planning and the Environment.
		7.	Netherlands Shipping Inspectorate.
P - Q	Poland	1.	PCBC, The Product Certification Body, Poland. Scientific and Research Centre for Fire Protection.
		2.	PZH, Certificate of the National Institute of Hygiene.
R - S	Romania	1.	Ministry of Industrial Affairs, General Inspectorate of the Military Fire Squad, Romania.
	South Africa	1.	South African Bureau of Standards, South Africa
		2.	CITY COUNCIL OF PRETORIA, South Africa Community Safety Department, Fire Brigade & Ambulance Services.
	Sweden	1.	Approval Swedish Ministry (ships).
T - Z	United Kingdom	1.	LPC - Loss Prevention Council.
		2.	BSI Product Services.

2.0 Purpose and Use

Target group

Only suitably trained and certified persons who are members of the authorised **FirePro®** sales organisation are allowed to use this user manual.

Scope

The autonomous stationary dry aerosol-based fire extinguishing components are designed for use as part of a fire extinguishing system. It is a precondition that the extinguishing components are linked to and activated by an effective fire detection system. Rapid detection and a fast reaction are essential in this regard.
It is a fire extinguishing component consisting of a packaging filled with a dry solid extinguishing agent which, following activation, is discharged as a dry aerosol with the function of extinguishing the fire.

FirePro® aerosol fire extinguishers and fire extinguishing systems are designed for the suppression of class A, B, C and F fires (as per EN2 Standard classification of fires) and for the prevention of explosions of gas and dust/air mixtures.

FirePro® aerosol fire extinguishers and fire extinguishing systems provide an efficient and effective way of extinguishing gas and liquid fires and burning solids, especially if the substances are derived from hydrocarbons (natural gas, oil products, flammable lubricants, etc), but also boiling oils and burning fats and fires in electrical equipment with an operating voltage not exceeding 75,000 volts.

FirePro® aerosol fire extinguishers and fire extinguishing systems must not be used in cases of:

- Core fires as referred to in class A
  (development of fire within a product or a quantity of products through the fuel, oxygen and temperature present therein without drawing them in from the surrounding area).
- Oxygen-bearing chemical substances such as nitro-cellulose and gunpowder.
- Reactive metals such as lithium, sodium, potassium, magnesium, titanium, zirconium, uranium and plutonium.
- Metal oxides.
- Organic peroxides and hydrazine.

Dry aerosol extinguishing products may not be used in rooms with flammable liquids or dust that can cause an explosive vapour/air mixture and for which a zone layout in accordance with the provisions of NPR 7910-1 or 2 has been laid down, unless appropriate arrangements have been made in the protected room so that the European ATEX Directive is met.

3.0 Safety Measures

Before bringing the ***FirePro®*** units into use please read through this user manual carefully.

When working with aerosol fire extinguishers and fire extinguishing systems it is **prohibited** to:

- dismantle the units;
- subject the units to the force of impact or other operations that can result in the deformation, physical or other mechanical damage of the container;
- carry out welding work in the proximity of the fire extinguishers, fire extinguishing systems and/or thermocord;
- smoke in the vicinity of the fire extinguishers, fire extinguishing systems and/or thermocord.

Should a ***FirePro®*** unit have fallen, it must be checked to determine whether or not the electrical circuit of the activator and/or other components have been damaged. If you cannot be certain that the ***FirePro®*** unit is undamaged and/or will function properly, it may **not** be used and it must be returned to the distributor.

The Working Conditions Act and health & safety information sheets

Ensure that you adhere to the obligations and advice described in the Working Conditions Act and health & safety information sheets. Pay particular attention to working at height. Ensure that you stand firmly and use reliable tools, materials and the correct personal protective equipment. Please address any questions to your employer and/or health & safety department.

4.0 Storage and Transport

FirePro® units are transported in accordance with the regulations and requirements applying to this category of cargo. Transport by air, land and water is permitted using any means of transport without any restrictions. ***FirePro®*** units that are transported must be securely fastened and protected from dirt, moisture and precipitation.

Important: Do not drop ***FirePro®*** units during loading or unloading.
Put the correct labels on the packaging in a prominent place.

Storage of ***FirePro®*** units takes place in their own packaging on racks in stores (either heated or unheated with natural ventilation, at a distance of not less than one metre from heaters).

Storage conditions:
Temperature: between –50 and +100 °C
Humidity: maximum 98% RH

5.0 Design, Generators Types and Data Sheets

5.1 Design

General description of **FirePro®** units:

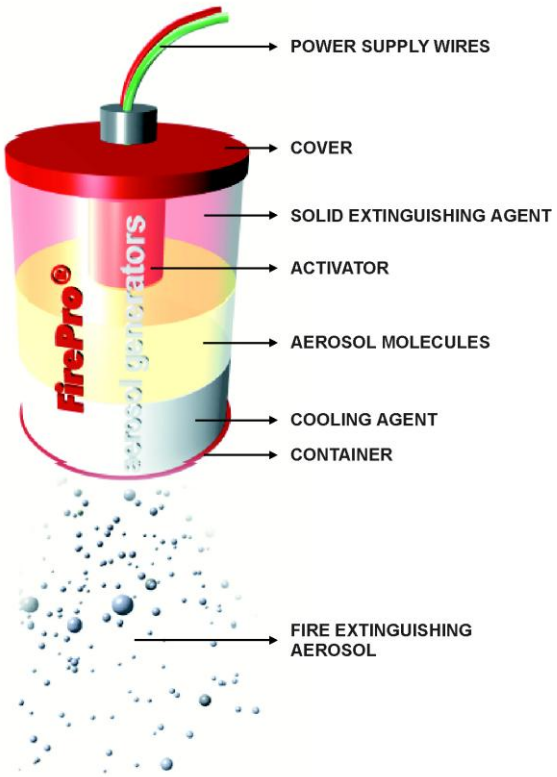
1) The fire extinguishers are metal containers of different shapes and sizes.
2) The solid, aerosol-forming compound SBK is used (see chemical analysis).
3) A special system is built into each container for the independent activation of the fire extinguisher.
4) Most types are equipped with a heat-absorbing mechanism (depending on the application).

FirePro® units can be supplied with two-sided discharge (exit openings). In this case the aerosol-forming substance is placed together with the activation system in the central part of the container between two heat-absorbing mechanisms and two membranes on the opening where the aerosol exits.

By applying a given voltage to the live parts of the aerosol fire extinguisher, or when the thermocord reaches the self-activation temperature, the extinguishing agent is activated and converted into aerosol. If the aerosol exits via the heat-absorbing elements (if applicable), it is cooled before flooding the protected volume, the fire being extinguished at the same time by retarding the combustion chain reaction.

FirePro® unit components

FirePro® unit designations



5.2 Overview of Various Generator Types

FP-8*

FP-20E

FP-20S

FP-40S

FP-80

FP-80S

FP-100S

FP-200S

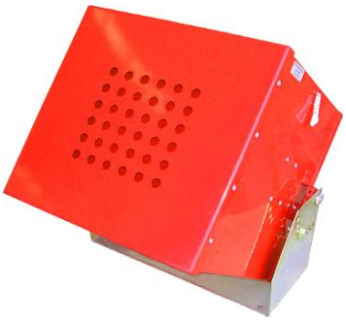
FP-500S

FP-200M*

FP-1000M*

FP-1200/2000/3000

19" PCSU (computer cabinet protection)**



FP-5700

* These types are not yet included in the product certification according to BRL-23001/03
** The units used in this product (FP-100S, FP-200S, FP-500S) are included in the product certification according to BRL-23001/03

5.3 Conical Nozzle

Technical Information

- Material: Steel ST1203, bright zinc galvanised
- Thickness: 2 mm
- Max. diameter: 77 mm

- Composition: a) conical model with 117 openings
  b) ring
  c) round base with three holes for fixing the screws, screwthreads

- Accessories: d) three conical screws
  e) Allen key for tightening the screws

Assembly instructions

1.) A special connector is supplied with models FP-200S and FP-500S. It fits around the round housing at the discharge opening and enables the connection of the nozzle with the three screws.

5.4 Data Sheets

FP-8

TECHNICAL INFORMATION	
Model	FP-8
Type	Hot
Activation mechanism	thermal activation by thermocord at 172 °C
Current intensity to be tested	N/A
Weight gross	14 g
Weight net extinguishing agent	8 g
Operational discharge time	3 - 6 seconds
Discharge outlet	1
Discharge length	0.5 m
Size	14 mm x 52 mm (diameter)
Self activation temperature	300 °C
Fire class	A, B, C, F
APPLICATIONS	
Hardware	computers, teleph. exchanges, projectors
Cabinets	electrical cabinets
VDUs	monitors, televisions
Sound installations	amplifiers, mixing desks, speakers
Instrumentation	mechanical machines, motors
Small switch boxes	relay boxes
Transformers (small)	portable welders

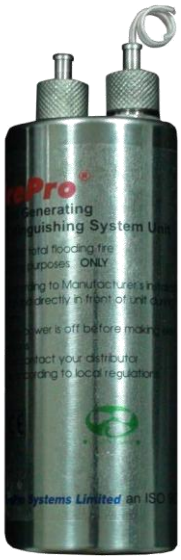
FP-20E

TECHNICAL INFORMATION	
Model	FP-20E
Type	Cold
Activation mechanism	thermal activation by thermocord at 172 °C electrical (6 - 36 V D/C 0.8 A in 3 - 4 sec)
Activator type	heating element with 2.3 ohm resistance
Current intensity to be tested	maximum 0.5 mA
Weight gross	100 g
Weight net extinguishing agent	20 g
Operational discharge time	3 - 6 seconds
Discharge outlets	2
Discharge length	0.3 m
Size	128 mm x 30 mm (diameter)
Self activation temperature	300 °C
Fire class	A, B, C, F
APPLICATIONS	
Hardware	computers, teleph. exchanges, projectors
Cabinets	electrical cabinets
VDUs	monitors, televisions
Sound installations	amplifiers, mixing desks, speakers
Instrumentation	mechanical machines
Switch boxes (medium)	relay boxes, meter cupboards (small)
Transformers (medium)	portable welders

FP-20S

TECHNICAL INFORMATION	
Model	FP-20S
Type	Cold
Activation mechanism	thermal activation by thermocord at 172 °C
Current intensity to be tested	N/A
Weight gross	290 g
Weight net extinguishing agent	20 g
Operational discharge time	5 - 10 seconds
Discharge outlet	2
Discharge length	0.6 m
Size	165 mm x 32 mm (incl. connector housing)
Self activation temperature	300 °C
Fire class	A, B, C, F
APPLICATIONS	
Hardware Cabinets VDUs Sound installations Instrumentation Switch boxes (medium) Transformers (medium)	computers, teleph. exchanges, projectors electrical cabinets monitors, televisions amplifiers, mixing desks, speakers mechanical machines relay boxes, meter cupboards (small) portable welders

FP-40S



TECHNICAL INFORMATION	
Model	FP-40S
Type	Cold
Activation mechanism	thermal activation by thermocord at 172 °C electrical (6 - 36 V D/C 0.8 A in 3 - 4 sec)
Activator type	heating element with 2.3 ohm resistance
Current intensity to be tested	maximum 5 mA
Weight gross	590 g
Weight net extinguishing agent	40 g
Operational discharge time	5 - 10 seconds
Discharge outlets	2
Discharge length	1.2 m
Size	140 mm x 51 mm
Self activation temperature	300 °C
Fire class	A, B, C, F
APPLICATIONS	
Hardware Cabinets Sound installations Instrumentation Switch boxes (medium) Transformers (medium)	computers, teleph. exchanges electrical cabinets amplifiers, mixing desks, speakers mechanical machines relay boxes, meter cupboards (small) portable welders

FP-80

TECHNICAL INFORMATION	
Model	FP-80
Type	Cold
Activation mechanism	thermal activation by thermocord at 172 °C electrical (6 - 36 V D/C 0.8 A in 3 - 4 seconds)
Activator type	heating element with 2.3 ohm resistance
Current intensity to be tested	maximum 5 mA
Weight gross	800 g
Weight net extinguishing agent	80 g
Operational discharge time	4 - 8 seconds
Discharge outlets	2
Discharge length	2 m
Size	180 mm x 50 mm
Self activation temperature	300 °C
Fire class	A, B, C, F
APPLICATIONS	
Hardware Cabinets Sound installations Instrumentation Switch boxes (medium) Transformers (medium)	computers, teleph. exchanges electrical cabinets amplifiers, mixing desks, speakers mechanical machines relay boxes, meter cupboards (small) portable welders

FP-80S

TECHNICAL INFORMATION	
Model	FP-80S
Type	Cold
Activation mechanism	thermal activation by thermocord at 172 °C electrical (6 - 36 V D/C 0.8 A in 3 - 4 sec)
Activator type	heating element with 2.3 ohm resistance
Current intensity to be tested	maximum 5 mA
Weight gross	820 g
Weight net extinguishing agent	80 g
Operational discharge time	5 - 10 seconds
Discharge outlets	2
Discharge length	2 m
Size	185 mm x 51 mm (incl. connector housing)
Self activation temperature	300 °C
Fire class	A, B, C, F
APPLICATIONS	
Hardware Cabinets Sound installations Instrumentation Switch boxes (medium) Transformers (medium)	computers, teleph. exchanges electrical cabinets amplifiers, mixing desks, speakers mechanical machines relay boxes, meter cupboards (small) portable welders

FP-100S

FirePro®
FP100S (100grs)
Jan 10 S.N. 10901
Aerosol Generating
Fire Extinguishing System Unit
Designed for total flooding fire extinguishing purposes ONLY
Install according to manufacturer's instructions only
Do not stand directly in front of unit during installation
Make sure power is off before making electrical connections
After use contact your distributor
Dispose according to local regulations
an ISO 9001 registered company

TECHNICAL INFORMATION	
Model	FP-100S
Type	Cold
Activation mechanism	thermal activation by thermocord at 172 °C electrical (6 – 36 V D/C 0.8 A in 3 – 4 sec)
Activator type	Heating element with 2.3 ohm resistance
Current intensity to be tested	Maximum 5 mA
Weight gross	1270 g
Weight net extinguishing agent	100 g
Operational discharge time	5 - 10 seconds
Nozzle	optional
Discharge outlet	1
Discharge length	1 m
Size	120 mm x 84 mm (incl. connector housing)
Self activation temperature	300 °C
Fire class	A, B, C, F
APPLICATIONS	
Hardware	servers, large teleph. Exchanges
Transport	car, lorry, bus, train, metro, tram
Instrumentation	cupboards, safes
Large switch boxes	meter cupboards, control units
Cabinets	electrical cabinets
Transformers (large)	industry

FP-200M

TECHNICAL INFORMATION	
Model	FP-200M
Type	Cold
Activation mechanism	manual by removing safety pin
Activation	chemical composition with 1.5 ohm resistance
Current intensity to be tested	N/A
Weight gross	1430 g
Weight net extinguishing agent	200 g
Operational discharge time	10 - 15 seconds
Discharge outlet	1
Discharge length	2 m
Size	145 mm x 88 mm (diameter)
Self activation temperature	300 °C
Activation by thermocord	N/A
Fire class	A, B, C, F
APPLICATIONS	
Rooms	server rooms, ceilings, floors
Transport	car, lorry, bus, train, metro, tram
Storage	cupboards, safes
Large switch rooms	meter cupboards, control units
Cabinets	electrical cabinets
Transformers (large)	industry

FP-200S

TECHNICAL INFORMATION	
Model	FP-200S
Type	Cold
Activation mechanism	thermal activation by thermocord at 172 °C electrical (6 - 36 V D/C 0.8 A in 3 - 4 sec)
Activator type	heating element with 2.3 ohm resistance
Current intensity to be tested	maximum 5 mA
Weight gross	1630 g
Weight net extinguishing agent	200 g
Operational discharge time	5 - 10 seconds
Nozzle	Optional
Discharge outlet	1
Discharge length	2 m
Size	150 mm x 84 mm (incl. connector housing)
Self activation temperature	300 °C
Fire class	A, B, C, F
APPLICATIONS	
Rooms	server rooms, ceilings, floors
Transport	car, lorry, bus, train, metro, tram
Storage	cupboards, safes
Large switch rooms	meter cupboards, control units
Cabinets	electrical cabinets
Transformers (large)	industry

FP-500S

TECHNICAL INFORMATION	
Model	FP-500S
Type	Cold
Activation mechanism	thermal activation by thermocord at 172 °C electrical (6 - 36 V D/C 0.8 A in 3 - 4 sec)
Activator type	heating element with 2.3 ohm resistance
Current intensity to be tested	maximum 5 mA
Weight gross	2850 g
Weight net extinguishing agent	500 g
Operational discharge time	5 - 10 seconds
Discharge outlet	1
Discharge length	2.5 m
Size	260 mm x 84 mm (incl. connector housing)
Self activation temperature	300 °C
Fire class	A, B, C, F
APPLICATIONS	
Rooms	server rooms, ceilings, floors
Transport	car, lorry, bus, train, metro, tram
Storage	cupboards, safes
Large switch rooms	meter cupboards, control units
Cabinets	electrical cabinets
Transformers (large)	industry

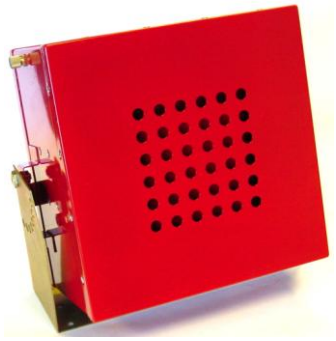
FP-1000M

TECHNICAL INFORMATION	
Model	FP-1000M
Type	Hot
Activation mechanism	manual by removing safety pin
Activation	composition with 1.5 ohm resistance
Current intensity to be tested	N/A
Weight gross	1680 g
Weight net extinguishing agent	1000 g
Operational discharge time	20 - 25 seconds
Discharge outlets	2
Discharge length	3 m
Size	200 mm x 88 mm (diameter)
Self activation temperature	300 ºC
Activation by thermocord	N/A
Fire class	A, B, C, F
APPLICATIONS	
Manual use	by professional user only
Rooms	server rooms, container
Transport	lorry, bus, train, metro, tram
Storage	cupboards, safes, archive
Large switch rooms	meter cupboards, control units
Industry	various

FP-1200

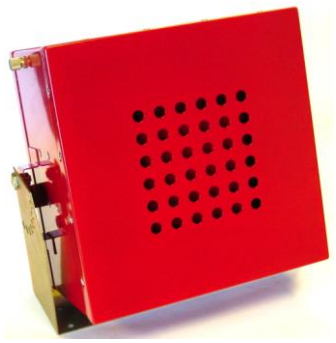
TECHNICAL INFORMATION	
Model	FP-1200
Type	Cold
Activation mechanism	thermal activation by thermocord at 172 ^{o}C electrical (6 - 36 V D/C 0.8 A in 3 - 4 sec)
Activator type	heating element 2.3 ohm resistance
Current intensity to be tested	maximum 5 mA
Weight gross	10050 g (excl bracket)
Weight net extinguishing agent	1200 g
Operational discharge time	10 -15 seconds
Discharge outlet	1
Discharge length	3.5 m
Size	216 mm x 300 mm x 167 mm
Fire class	A, B, C, F
APPLICATIONS	
Rooms	server rooms, computer rooms, central control rooms, various
Transport	shipping, train, aircraft
Storage	store, archive
Mechanical rooms	engine rooms, plant rooms
Industry	various

FP-2000



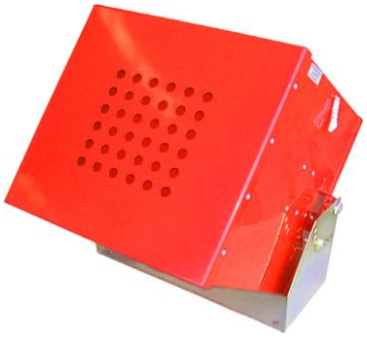
TECHNICAL INFORMATION	
Model	FP-2000
Type	Cold
Activation mechanism	thermal activation by thermocord at 172 °C electrical (6 - 36 V D/C 0.8 A in 3-4 sec)
Activator type	heating element 2.3 ohm resistance
Current intensity to be tested	maximum 5 mA
Weight gross	14100 g
Weight net extinguishing agent	2000 g
Operational discharge time	10 - 15 seconds
Discharge outlet	1
Discharge length	3.5 m
Size	300 mm x 300 mm x 185 mm
Self activation temperature	300 °C
Fire class	A, B, C, F
APPLICATIONS	
Rooms	server rooms, computer rooms, central control rooms, various
Transport	shipping, train, aircraft
Storage	store, archive
Mechanical rooms	engine rooms, plant rooms
Industry	various

FP-3000



TECHNICAL INFORMATION	
Model	FP-3000
Type	Cold
Activation mechanism	thermal activation by thermocord at 172 °C electrical (6 - 36 V D/C 0.8 A in 3-4 sec)
Activator type	heating element 2.3 ohm resistance
Current intensity to be tested	maximum 5 mA
Weight gross	15000 g
Weight net extinguishing agent	3000 g
Operational discharge time	15 - 20 seconds
Discharge outlet	1
Discharge length	4 m
Size	300 mm x 300 mm x 185 mm
Self activation temperature	300 °C
Fire class	A, B, C, F
APPLICATIONS	
Rooms	server rooms, computer rooms, central control rooms, various
Transport	shipping, train, aircraft
Storage	store, archive
Mechanical rooms	engine rooms, plant rooms
Industry	various

FP-5700



TECHNICAL INFORMATION	
Model	FP-5700
Type	Cold
Activation mechanism	thermal activation by thermocord at 172 °C electrical (6 - 36 V D/C 0.8 A in 3-4 sec)
Activator type	heating element 2.3 ohm resistance
Current intensity to be tested	maximum 5 mA
Weight gross	23700 g
Weight net extinguishing agent	5700 g
Operational discharge time	15 - 20 seconds
Discharge outlet	1
Discharge length	8 m
Size	300 mm x 300 mm x 300 mm
Self activation temperature	300 °C
Fire class	A, B, C, F
APPLICATIONS	
Rooms Transport Storage Mechanical rooms Industry	central control rooms, various shipping, train, aircraft store, archive engine rooms, plant rooms various

19” PCSU FP-200/A2

TECHNICAL INFORMATION	
Model	19” Patch Cabinet Safety Unit FP-200/A2
Power required	230 V
Model FirePro® inside	FP-200S Cold
Extinguishing agent content	146 g effective
Detection by means of	Two detector dependent optical/ionisation smoke detector. On request single detector thermal detection T 58 ºC
Standard controls	Continuous line monitoring, maximum 5 mA Tripping of mechanical ventilation Floating contact Variable delay of 5 – 15 - 30 seconds
Operational discharge time	10 - 15 seconds
Discharge outlet	1
Discharge length	± 2000 mm
Size exc. front plate	H x W x L: 140 mm x 430 mm x 450 mm
Weight gross	9700 g
Fire class	A, B, C, F
For additional information	Installation manual available with every product
APPLICATIONS	
Enclosed hardware with a maximum volume to 2 m^3	19” patch cabinets Telephone exchanges

Example:

meter cupboard protection

6.0 Risk Assessment

Risk assessment is a series of logical steps for enabling, in a systematic manner, the appraisal of hazards associated with installations. Risk assessment is followed, if the need arises, by risk reduction as described in chapter 5 of EN 292-1:1991. Repetition of this procedure sets in train the iterative process by which risks are excluded as far as possible and safety measures are taken.

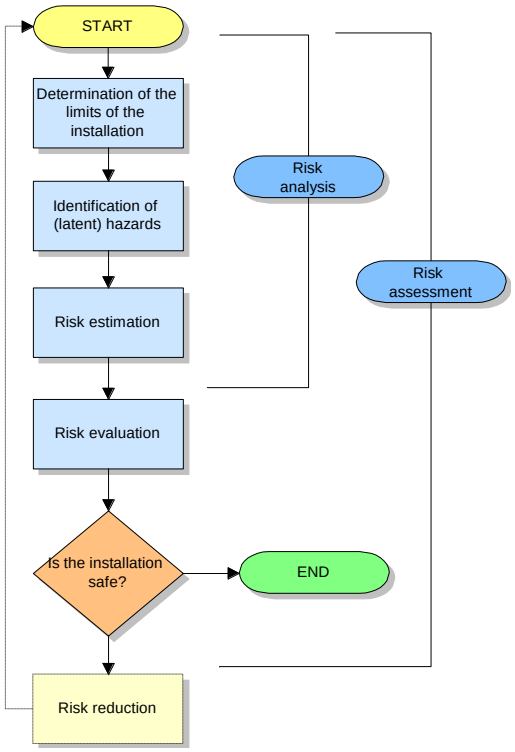
Risk assessment comprises (see figure 1):

- risk analysis.
  a) determination of the limits of the installation.
  b) identification of (latent) hazards.
  c) risk estimation.

- risk evaluation.

The risk analysis provides the information needed for the risk evaluation, which in its turn allows a judgment to be made about the safety of the installation (see EN292-1:1991).

Risk assessment depends on judicious decisions. These decisions must be supported by qualitative methods and, where possible, be supplemented by quantitative methods. Quantitative methods are especially applicable if the foreseeable scope of the damage is high.



Quantitative methods are useful for assessing and for determining alternative safety measures that give measures better protection.

The application of quantitative methods is limited by the amount of usable information available and in many applications only a qualitative risk assessment will be possible.

The risk assessment must be carried out so that it is possible to document the procedure followed and the results achieved.

Risk reduction and the choice of suitable safety measures do not form part of the risk assessment. You are advised to read EN 292-1:1991 and 292-2.

An overview of risk assessment can be found in NEN-EN 1050.

7.0 Calculation of Amount of FirePro® Required

General:
Different factors are important for the calculation of the amount of FirePro® aerosol required, and they are:
a) The fire class
b) Total volume of the room
c) Ventilation in the room
d) Atmospheric pressure present
e) Protection time in the room
f) The added safety factor
g) The siting of the given type of unit

Some of the above factors are fixed factors, others have limited variability. The fixed calculation factors are:

- volume of the room to be protected
- the fire class of the substances present in the room

The basic method of calculation is the formula: $M = V \times D$

where

- M = total flooding quantity, in gr.
- V = protected volume (enclosure), in m^3
- D = design application density, in gr/m^3 (see table 7.0.1)
- D = extinguishing application density x safety factor (1.3)

Table 7.0.1

Class of Fire	Extinguishing application density	Minimum design application density
Class A Fuels:	76.4 gr/m^3	99.32 gr/m^3
Class B Fuels:	55.4 gr/m^3	72.02 gr/m^3
Class C Fuel:	49.8 gr/m^3	64.74 gr/m^3
Class F Fuel:	80.83 gr/m^3	105.08 gr/m^3

Calculation Sheet: below is an example of the electronic calculation sheet for trained and authorised persons. FirePro®

Design Calculation Sheet

SELECT UNITS

VOLUME
(if not to be calculated)

ROOM NAME & No.

SPACE TYPE

ROOM SHAPE

SECTION DIMENSION x x = ***VOLUME***

CLASS OF FIRE

STREAM REQUIRED (m) m

SAFETY FACTOR (sf)**

****FOR ADDITIONAL SAFETY REPLACE CURRENT SAFETY FACTOR AS APPLICABLE**

TOTAL VOLUME THIS ROOM IN CUBIC METERS (m3)

M (g)		**V (m3)**			**df**		
Mass of FirePro® Aerosol		Total Volume			mef		sf
Extinguishing Material Required (g)	=		m^3	**x**	g/m3	**x**	0.0

RECOMMENDED GENERATOR MODEL(S) SELECTION

IMPORTANT REMARKS:

1. THIS SOFTWARE IS ONLY A GUIDING TOOL - SELECTION OF GENERATORS IS THE USER's RESPONSIBILITY.

2. ABOVE SELECTION IS JUST A RECOMMENDATION. ENGINEERING JUDGMENT SHOULD BE APPLIED FOR PROPER SELECTION OF GENERATO CONSIDERATION ROOM HEIGHT(STREAM LENGTH), GENERATOR ORIENTATION IN RELATION TO THE VOLUME ARRANGEMENT, OPENINGS etc.
3. FOR PROTECTED VOLUMES EXCEEDING 4M HEIGHT GENERATORS SHOULD BE INSTALLED IN STAGGERED ARRANGEMENT TO ENABLE PROPER TOTAL FLOODING - PLEASE CONSULT MANUFACTURER.
4. ALWAYS CHECK CALCULATIONS FOR CORRECTNESS

TOTAL VOLUME ENTIRE SECTION

TOTAL FirePro® MASS REQUIRED ENTIRE SECTION

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8.0 Preconditions in the Design of an Installation

The calculation must be made compartment by compartment. The compartment must be completely separate (including above the suspended ceiling and beneath the raised floor). The Wall-Fire-Penetration-Fire-Flashover (WBDBO) of the room must at least conform to the prescribed legislation and regulations. If a higher standing time has been calculated than the standard, the WBDBO must be adjusted to it. The doors must, in the event of fire, be self-closing and if necessary be activated by the control system. Windows, (smoke/heat) hatches and/or ventilation systems must be and remain switched off and closed during the extinguishing.

Leakage losses must have been considered and will, if necessary, form part of the calculation and siting. If the room is actually completely enclosed, any pressure displacement by the thermals is to be expected. Sufficient account must be taken of this. The use of the room must be included in the calculation and have been considered as part of the aftercare.

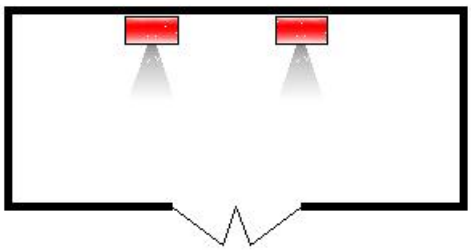
Safe distances and height restriction.

A safe distance has been laid down in respect of (flammable) materials and persons for each individual **FirePro®** unit in relation to the discharge of the aerosol. Its value is given in metres, as can be seen in the "Aerosol temperature and time of action table" under "Discharge temperature". Here L2 is the safe distance from (flammable) materials and L3 from persons.
Apart from the safe distance a height restriction has been laid down for the protection of a room for each individual **FirePro®** unit. If the aerosol exits from the unit vertically, the value of the discharge length of each unit is to be regarded as maximum height to be installed. Its value is given in metres, as can be seen in the "Aerosol temperature and time of action table" under "Discharge length". If a different angle is used, the height must be reduced accordingly. For larger/higher rooms several units must be evenly spread, in accordance with the height restriction for each unit, over the whole room.

Direction of aerosol discharge.
The siting in the room according to Figure 3a is incorrect: the discharge opening is pointing towards a door. Consequently, aerosol will be lost in the course of extinguishing if the door is open. In the room according to Figure 3b the units are correctly sited.

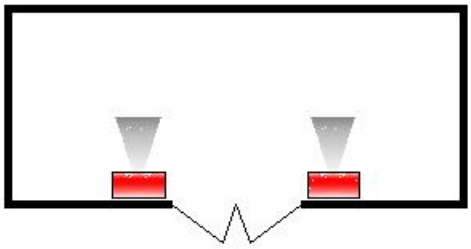
Figure 3:

Figure 3a



INCORRECT

Figure 3b



CORRECT

Technical Information

The tables below show the various technical aspects to be taken into account at the time of installation.

Aerosol temperature and time of action								
		Discharge	Discharge	Discharge temperature (°C)			Discharge duration (sec)	
Ref.	Model	outlets	length (m)	L1,(m)	L1-L2,(m)	L2-L3,(m)	Min.	Max.
1	**FP-8**	1	0.5	0-0.1	0.1-0.2	0.2-0.3	3	6
2	**FP-20E/FP-20S**	2	0.3	0	0-0.1	0.1-0.2	3	6
3	**FP-40S**	2	1.2	0	0-0.1	0-0.3	5	10
4	**FP-80/FP-80S**	2	2.0	0	0-0.1	0.1-0.3	4	8
4	**FP-100S**	1	1.0	0	0-0.2	0.2-0.4	5	10
5	**FP-100S w/n**	1	1.0	0	0-0.1	0.1-0.2	5	10
6	**FP-200M**	1	2.0	0	0-0.3	0.3-1.4	10	15
7	**FP-200S**	1	2.0	0	0-0.3	0.3-1.4	5	10
8	**FP-200S w/n**	1	1.5	0	0-0.1	0.1-0.3	5	10
9	**FP-500S**	1	2.5	0	0-0.5	0.5-1.8	5	10
10	**FP-500S w/n**	1	2.0	0	0-0.1	0.1-0.5	5	10
11	**FP-1000M**	2	3.0	0-1.0	1.0-1.5	1.5-2.5	20	25
12	**FP-1200**	1	3.5	0	0	0-1.0	10	15
13	**FP-2000**	1	3.5	0	0	0-1.0	10	15
14	**FP-3000**	1	4.0	0	0-0.5	0.5-1.5	15	20
15	**FP-5700**	1	8.0	0	0-0.5	0.5-1.5	15	20

L1 = Distance in metres between the outlet and the point where the temperature is > 300°C
L2 = Distance in metres between the outlet and the point where the temperature is < 200°C
L3 = Distance in metres between the outlet and the point where the temperature is < 75°C
w/n = with nozzle

Important!

The distances shown under discharge length are those to be regarded as a maximum to obtain a rebound of discharge onto the surface (such as the floor) that then guarantees a good homogeneous spread of the aerosol in the protected compartment.
The temperatures shown under discharge temperature relate to the distances. In cases of storage of materials, cables, sensitive parts and/or the presence of persons, prevent them from coming into contact with discharges the heat of which is such that it can give rise to damage and/or injury.

		Weight in g		Size (mm)		Unit	
Model	**Activation**	**Gross**	**Net**	**Height**	**diameter**	**outlets**	**version**
FP-8	TH	14	8	14	52	1	Hot
FP-20E	E &TH	100	20	128	30	2	Cold
FP-20S	TH	290	20	165	32	2	Cold
FP-40S	E & TH	590	40	140	51	2	Cold
FP-80	E&TH	800	80	180	50	2	Cold
FP-80S	E & TH	820	80	185	51	2	Cold
FP-100S	E&TH	1270	100	120	84	1	Cold
FP-200M	M	1430	200	145	88	1	Cold
FP-200S	E&TH	1630	200	150	84	1	Cold
FP-500S	E&TH	2850	500	260	84	1	Cold
FP-1000M	M	1680	1000	200	88	2	Hot
FP-1200	E & TH	10050	1200	216 x 300 x 167		1	Cold
FP-2000	E&TH	14100	2000	300 x 300 x 185		1	Cold
FP-3000	E&TH	15000	3000	300 x 300 x 185		1	Cold
FP-5700	E&TH	23700	5700	300 x 300 x 300		1	Cold

Self-activation temperature of the SBK solid aerosol forming compound is approx. 300 ^{o}C

TH = thermocord
E = electrical activation
M = manual (manual operation)
w/ = with nozzle

"Where to use" which version of aerosol	
Aerosol version	**Environment**
Hot	Without presence of flammable gas
Cooled	Without presence of flammable gas
Cold	In presence of flammable gas

Important!

The overviews below give an indication of the heat emission. You must take these temperatures and minimal free discharge parabolas into account when siting and installing. Positioning of the unit at the right angle can be very important in this regard.

The diagrammatic representations in Figures A, B and C are derived from the table on page 39 in which the factors L1, L2 and L3 have been included.

The figure shown here gives the combination of colour and associated temperature.

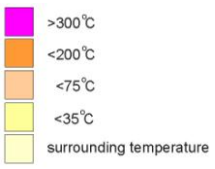


Figure A

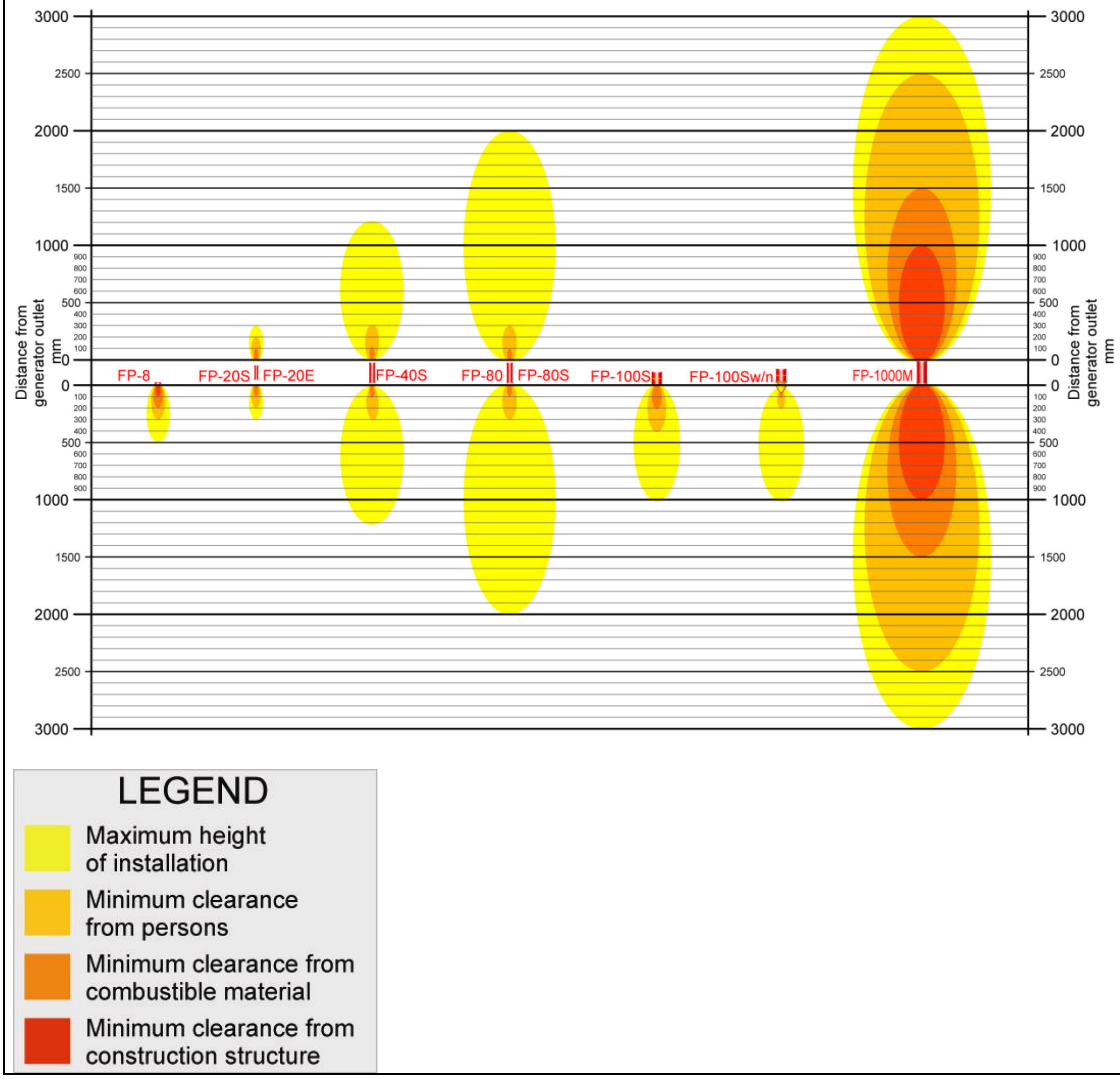

3000
2500
2000
1500
1000
500
0
Distance from generator outlet mm
FP-8
FP-20S
FP-20E
FP-40S
FP-80
FP-80S
FP-100S
FP-100Sw/n
FP-1000M
LEGEND
Maximum height of installation
Minimum clearance from persons
Minimum clearance from combustible material
Minimum clearance from construction structure

Figure B

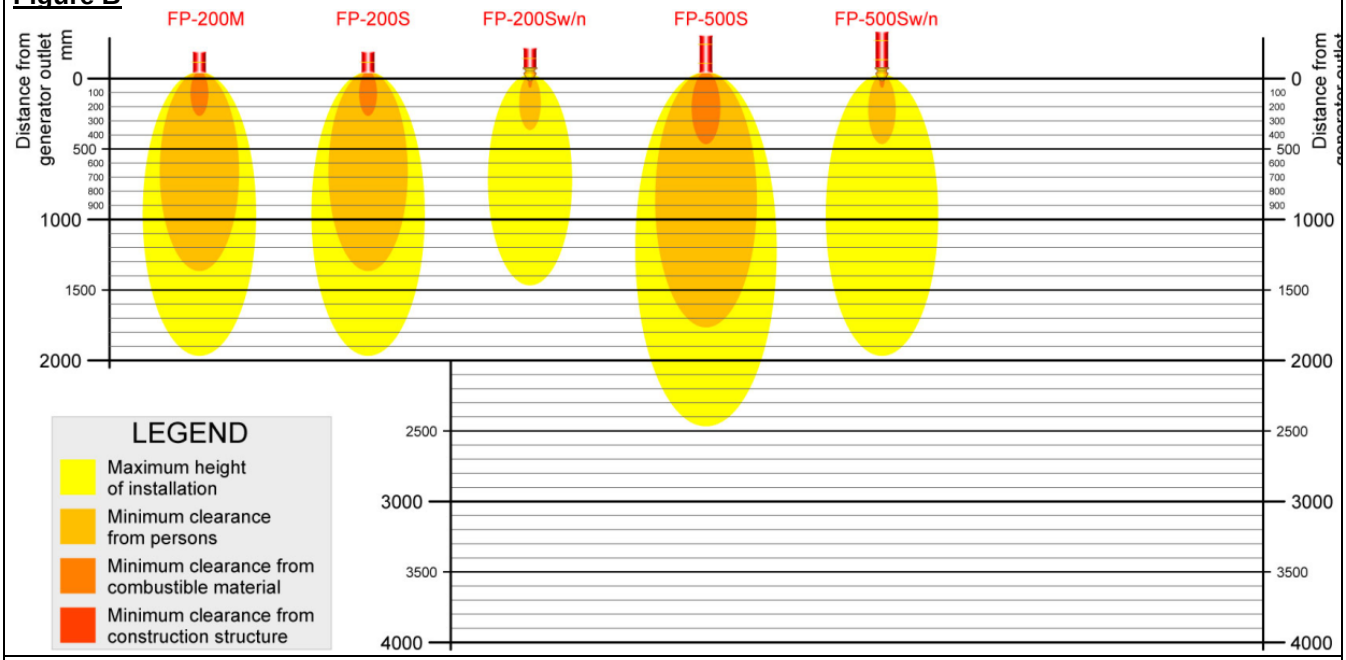
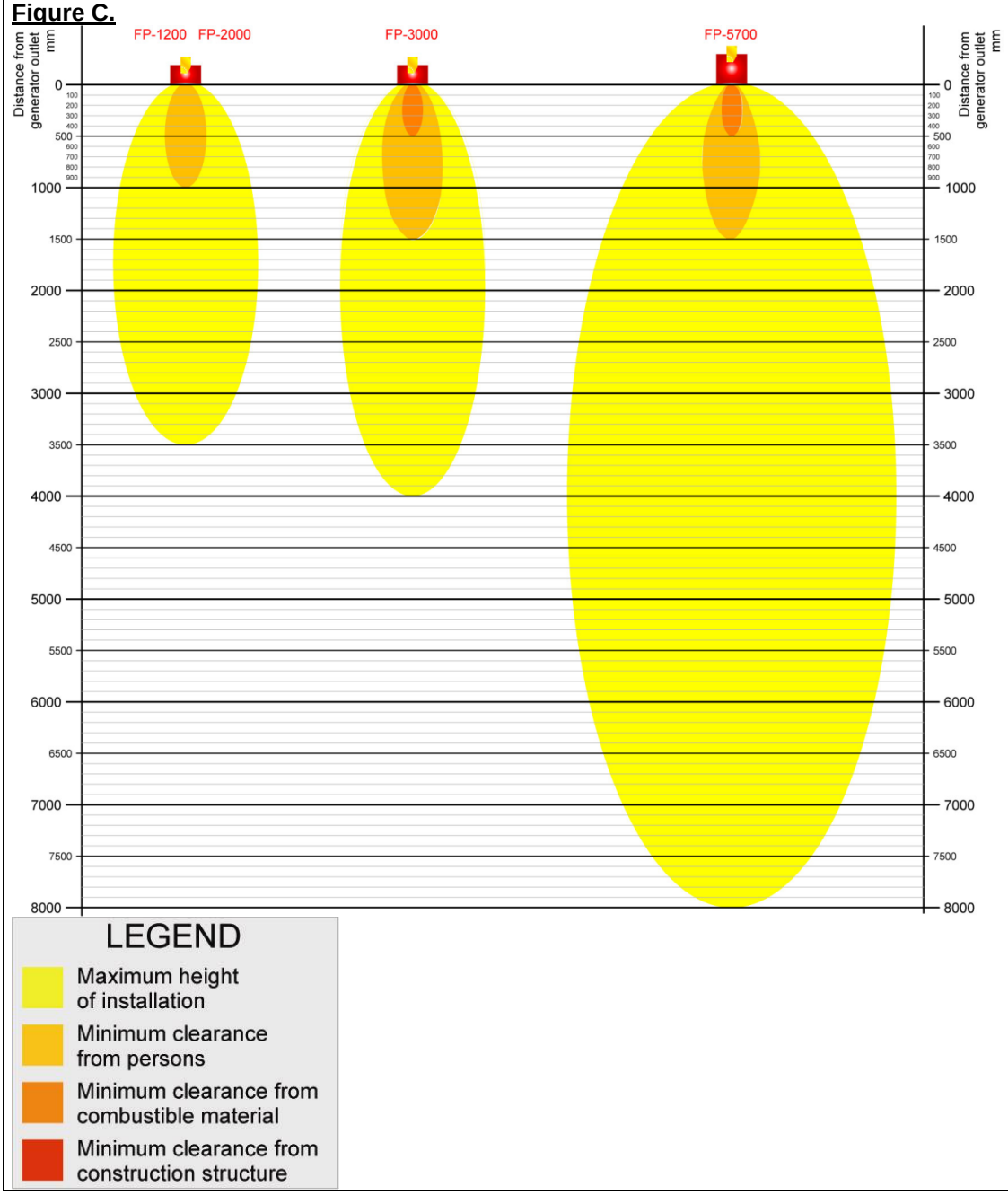

FP-200M
FP-200S
FP-200Sw/n
FP-500S
FP-500Sw/n
Distance from generator outlet mm
0
100
200
300
400
500
600
700
800
900
1000
1500
2000
2500
3000
3500
4000
LEGEND
Maximum height of installation
Minimum clearance from persons
Minimum clearance from combustible material
Minimum clearance from construction structure

Figure C.



Important !

Sensitive equipment such as computers can react to great temperature differences. When extinguishing gases liquefied under pressure are injected into the room, cooling takes place. In the case of aerosol-forming units the temperature can rise. In both cases the restoration and maintenance of the temperature in the room concerned (± 20ºC) is important for the proper functioning of the sensitive equipment.

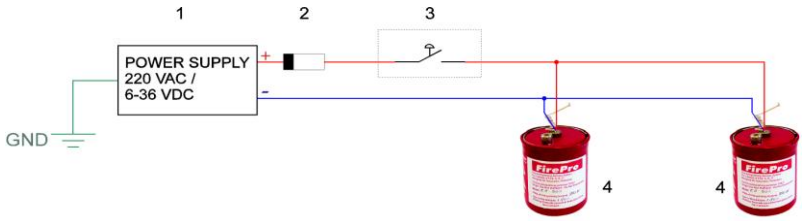
9.0 Activation Methods

9.1 Types of Activation

Depending on the specific requirements **FirePro®** units can be activated in the following ways:

A. By means of an electrical impulse with a direct voltage from 6 / 36 volts or higher. This voltage is applied to the bipolar connector of the model E fire extinguisher (for example by using a manual switch); see **Figure 1**. The type E models are equipped with the activator shown in chapter 9.2.

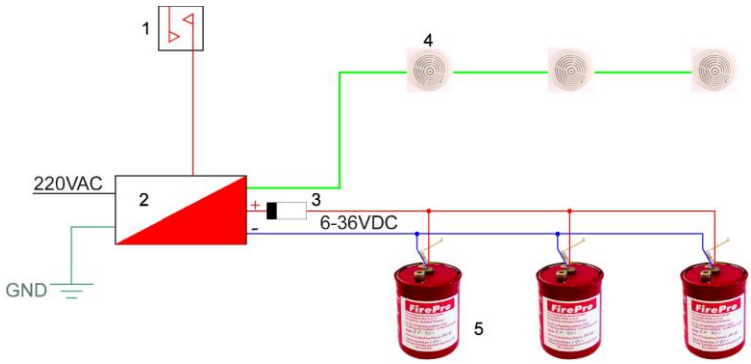
Figure 1:



1. Power supply with output from 6/36 V DC or higher
2. Fuse
3. Hand-operated switch
4. Connect **FirePro®** units in parallel

B. Automatically by means of heat, smoke or gas detectors, which are connected to an alarm panel. Here too activation is electrical, as described above; see **Figure 2**.
If extinguishing lines connected in parallel are used, it must be established that a short circuit only puts the power supply of the extinguishing line concerned out of operation. The power supply to the other extinguishing lines connected in parallel must be maintained. Explanation: each extinguishing line must have its own power supply fuse; having a fuse in the main power supply that puts the availability of all the extinguishing lines out of operation in the event of a short circuit in a single extinguishing line is not permitted. The background to this is that a short circuit can occur on activation of an extinguishing line, which may not affect the availability of the extinguishing lines not yet activated.

Figure 2:

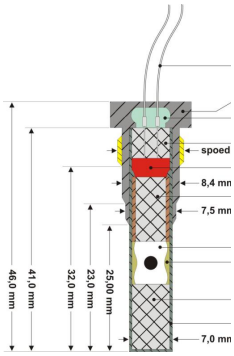


1. Hand-operated switch
2. control panel
3. fuse
4. automatic fire detector
5. **FirePro®** units

C. Automatically by means of the thermocord (type TH models) which is activated at a preset temperature.

D. Manually (type M models) by means of the activating charge located in the fire extinguisher.

Type E models: for these models the required activation current is a minimum of 0.8 A. This current is supplied by a battery of a 6/36 V (DC voltage) and 2.2 Ah (or greater). The direct current resistance of the electrical activation element is 2 ohm. The activation time is 3-4 seconds (or longer, depending on the model). During or immediately after activation the electrical activation element becomes an open circuit.



You must take account of the peak voltage during activation and a required short circuit protection.

Type TH models: with these models the activation takes place automatically by means of the thermocord which, as soon as the temperature reaches a preset level, activates the aerosol-forming extinguishing solid compound SBK.

The thermocord functioning at relatively low temperature is used for normal applications, while the thermocord functioning at relatively high temperature is used in rooms where heat sources are present, such as factory rooms, boiler rooms, engine rooms, etc. In such environments the temperature can reach high values in normal operating conditions. Here a thermocord with an activation temperature of 300 ºC can be used.

For lower activation temperatures other types of detector can be used that are connected to the fire extinguishers through the fire alarm panel. In this case the thermocord is used as activation setting with the effect of a safety valve that activates where other detectors fail to activate the system.

Type M models: with these models activation is by hand by pulling a metal ring. This is fixed to an activating charge (20 mg). Prior to the discharge of the aerosol from the fire extinguisher a time delay of 10-20 seconds is permitted (depending on the model), so that the extinguisher can be put into operation in the vicinity or in the midst of the flames.

9.2. Electrical Activator

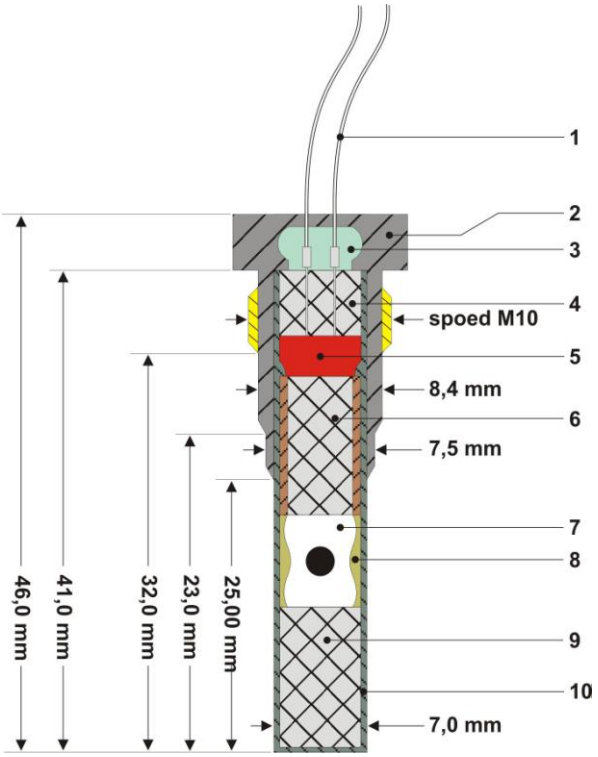
The electrical activator for the units is fed by two heat-resistant feed wires. The feed wires feed a coil, which is heated by the supply current. The minimum amount of activation energy required is supplied by a DC voltage of 6-36 V/0.8 A for 3 to 4 seconds. The coil is heated. This heat causes the Solid Bound Compound to activate. Given that this reaction is exothermic, the temperature arising will be transmitted through the holes in the cylinder to the solid bound compound of the **FirePro®** unit.

Electrical values:

Bridge resistance	1,6….2,6 Ohm
Activation pulse	Ab 0,8 mWs/Ω
No fire value	≤ (0,02 +/-0,001)A
DC voltage	6-36 V/0.8 A
Warm-up time	3 to 4 sec.

Temperature values:

Deployment temp. range	-50 ºC to 100 ºC
Storage temp.	-50 ºC to 50 ºC



1. HEAT RESISTANT WIRES
2. STAINLESS STEEL HOUSING
3. POLYMERIC GLUE
4. POLYMERIC PLUG
5. SOCKET WITH SPIRAL
6. POLYMERIC INSERTION WITH CONTACTS
7. CYLINDER WITH 2 OUTLETS
8. PRESSURING TAPE
9. SOLID BOUND COMPOUND (SBK)
10. COPPER-TIN COATING OR TINNED SURFACE

This electrical activator is a standard component of all electrically activated **FirePro®** units.

9.3 Thermocord (heat-conducting cord)

The thermocord is a heat-conducting cord. The thermocord has a special composition that automatically takes effect as soon as the temperature rises to a preset level or when it is exposed directly to fire.

The thermocord transmits the energy needed to activate the solid aerosol-forming composition.

9.3.1 Types of Thermocord

(A) Type: G T-C/B 172^{0}C: (general thermo-cord with braiding 172^{0}C)

Temperature of Operation: **172 ^{o}C**
Thickness: **2.35 mm**
Colour: **Black**

Chemical composition:
- Natural rubber 20-28 %
- Ammonium Per-Chlorate 50-65%
- Plasticizer 2-4%
- Catalyst Fe_2O_3 2-5%
- Additives 2-4%

This type of thermo-cord is covered with a white synthetic protective braiding to better contain and protect it from breakages during handling, transportation and installation. It operates at 172^{0}C.
It is commonly used in installations in small and medium size enclosures.
It is available ex-stock.

(B) Type: G T-C/B: (general thermo-cord with braiding)

Temperature of Operation: **300 ^{o}C**
Thickness: **2.35 mm**
Colour: **Black**

Chemical composition:
- Natural rubber 20-28 %
- Ammonium Per-Chlorate 50-65%
- Plasticizer 2-4%
- Catalyst Fe_2O_3 2-5%
- Additives 2-4%

It is available only on special orders, whenever the required operation temperature is 300 ^{0}C.

(C) Type: S T-C 2.8C Connector Thermocord

Temperature of Operation: **172 ^{o}C**
Internal diameter: **2.8 mm**
Colour: **Brown**

Chemical composition:
- Natural rubber 20-28 %
- Ammonium Per-chlorate 30-40%
- Plasticizer 20-25%
- Catalyst Fe_2O_3 2-5%
- Additives 2-4%

It is used to enable the G T-C/B to detect and activate at 172 ^{0}C. This is achieved by attaching, during the manufacturing process, small-cut pieces (of approx.10mms) of S T-C 2.8C at regular intervals (of 0.5m) along the G T-C/B.

It is available only on special orders.

9.3.2 Instructions For Use of Thermocord

ON INSTALLATION:
When installing thermocord, on walls or ceilings or other solid surfaces, care must be taken to ensure that the occurrence of breaks during the installation or the fixing is prevented. Do not exert too much pressure on the cord or the protective braiding.

Prohibition:
Keep away from heat during installation. Do not therefore smoke or do other hot work near the thermocord and/or ***FirePro***® units.

When determining the route along which the thermocord is to be laid, take care to prevent third parties accidentally causing damage to the thermocord. When fixing ensures that there are no curves or bends along the route with a radius of less than 20 mm.

The thermocord is fixed to surfaces using clamps designed for the purpose. The installation can be effected using two kinds of fixing bracket:

- plastic bracket type N2 (screw bracket)
- aluminium bracket type ASK3 (adhesive bracket)

The first clamp must be fixed to a ***FirePro***® unit. Spread the other clamps evenly along the entire length of the thermocord, roughly 300 mm apart. This is to prevent breakage and to guarantee good transit of oxygen.

FirePro® models are produce with a brass metal thermocord connector either on one side of the unit or on the upper part of the unit; insert the thermocord end from the network into the **connector's top** hole first, then pass it through the **conical component** and then tie a knot in the end. Hold the thermocord in the connector on the unit and screw the metal cover over the connector hand tight again.

Important note:
The S T-C 2.8 mm 172 ºC is integrated during manufacturing into the G T-C or the G T-C/B by placing small pieces at regular intervals for activation at 172 ºC.

Remember that the steps below must be taken when connecting the thermocord to the units:
(a) A knot must be made in the end to be inserted.
(b) A length of at least 40-50 mm of thermocord must be inserted in the connector.
(c) There must be a small hole just under the knot, for the purpose of the oxygen flow.

Place the thermocord in an adhesive bracket on the ***FirePro***® unit so as not to put the connection under strain and so prevent damage.

In installations where there is an increased chance of damage and in rooms where vibrations occur, such as engine rooms, the thermocord must be protected with a protective metal spring.

Warning:

Do not use any adhesive tape, adhesives or glue for the thermocord connections. The chemical substances used in adhesive materials react aggressively and have a detrimental effect on the thermocord composition. This can lead to damage or breakage.

Note:

The thermocord supplied by the manufacturer comes with pin holes that have been made at regular intervals of approximately 1 metre over the entire length of the cord. This is necessary for the supply of oxygen, so that the thermocord can transmit the heat even more efficiently over the entire length of the cord.

Whatever length of thermocord is connected to the unit, it is therefore absolutely necessary that an opening be made in the thermocord within a distance of 10 mm from the insertion point of the thermocord in the connector.

Note:

Ensure that the hole (c) is not so large that a weakness develops in the thermocord, so that on activation a break could occur and the transfer of heat no longer takes place.

These steps are necessary to ensure that the thermocord makes contact and can activate the solid aerosol-forming substance.

9.3.3 Thermocord Connections

Diagram 1
Overlap the two Thermocord ends and tie them firmly near to the two ends with plastic cable tie. Caution to not tie the connection too tie as Thermocord may snap

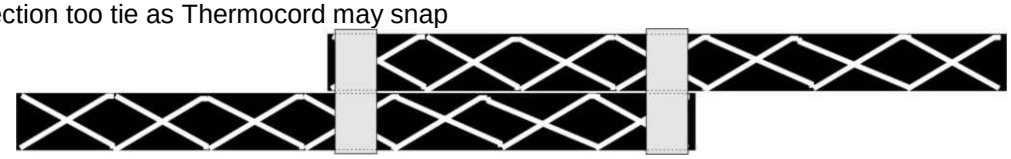


Diagram 2
The creation of a T-connection, overlap the Thermocord and as above firmly tie with plastic cable tie.

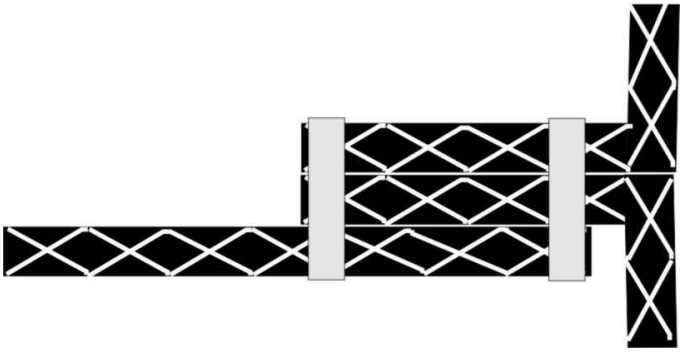
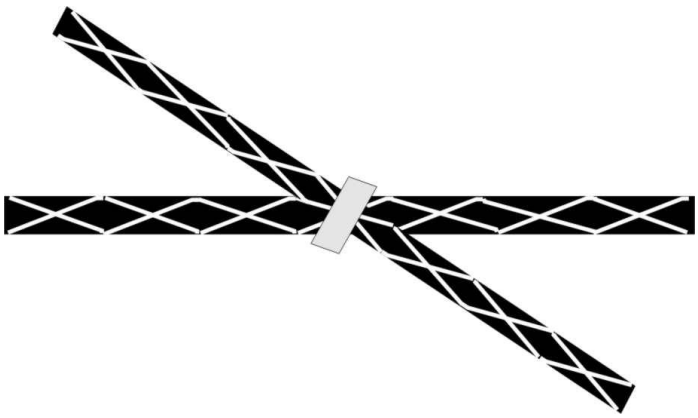


Diagram 3
To create a cross connection, where the two thermocord cross one another firmly tie with plastic cable tie.



Note:

Wherever a thermocord is used the sticker shown on the right must be placed in a prominent position.

FirePro®
HEAT SENSITIVE CORD
IS A PART OF THE
FIRE EXTINGUISHING AEROSOL SYSTEM
DO NOT HEAT - DO NOT REMOVE
Do not smoke in this area !
In the event of damage:
contact immediately your dealer

9.4 Manuals (hand-operated extinguishing units)

TYPES OF MANUAL
FirePro® manuals (hand-operated extinguishing units) come in two types: the FP-200M and the FP-1000M.

Warning:

The manual systems may only be used by trained users.

Note on use:

A distinction must be made between the FP-200M and the FP-1000M. The FP-200M can and may be used by emergency response team members or the equivalent. The FP-1000M may only be used by professionals such as the municipal fire brigade or users with equivalent training.

ACTIVATION
With the manuals activation is by hand, by pulling a metal ring fixed to an activation charge (20 mg). Prior to the discharge of the aerosol from the fire extinguisher a time delay of 10-20 seconds is permitted (depending on the model) so that the extinguisher can be put into operation in the vicinity or in the midst of the flames. Following the activation of the manual, it must be rolled directly in the direction of the fire. Before activation the right location must be chosen for the manual to do its work.

POSITIONING
The manuals must be kept in a cool dry place away from sources of heat. A clear notice must be posted that these units may only be activated by trained users. When placed in vehicles they must be positioned so that they cannot be damaged by knocks or jolts.

MAINTENANCE
Maintenance on the FP-200M and/or FP-1000M may only be carried out by technical personnel of the dealers who have successfully completed a CATTAS training course. An inspection once a year is required.

Safety measures:

Before bringing the manual into use read through this user manual carefully. When working with aerosol fire extinguishers and fire extinguishing systems it is **prohibited** to:
- dismantle the units;
- subject the units to the force of impact or other operations that can result in the deformation, physical or other mechanical damage of the container;
- carry out welding work;
- smoke in the vicinity of the fire extinguishing systems.

Should a unit have fallen, then it must be checked by a trained and certified person (CATTAS) to ensure that the activation and/or other components have not been damaged.

The warranty for the manuals is one year.

10.0 Preparation For Installation

- Make a visual inspection of the exterior of the **FirePro®** unit.
- Use a measuring device (ohmmeter with an accuracy of at least 2.5) to check that the internal electrical circuit of **FirePro®** units fitted with electrical activators is intact. The control current must not exceed 5 mA.

Important:

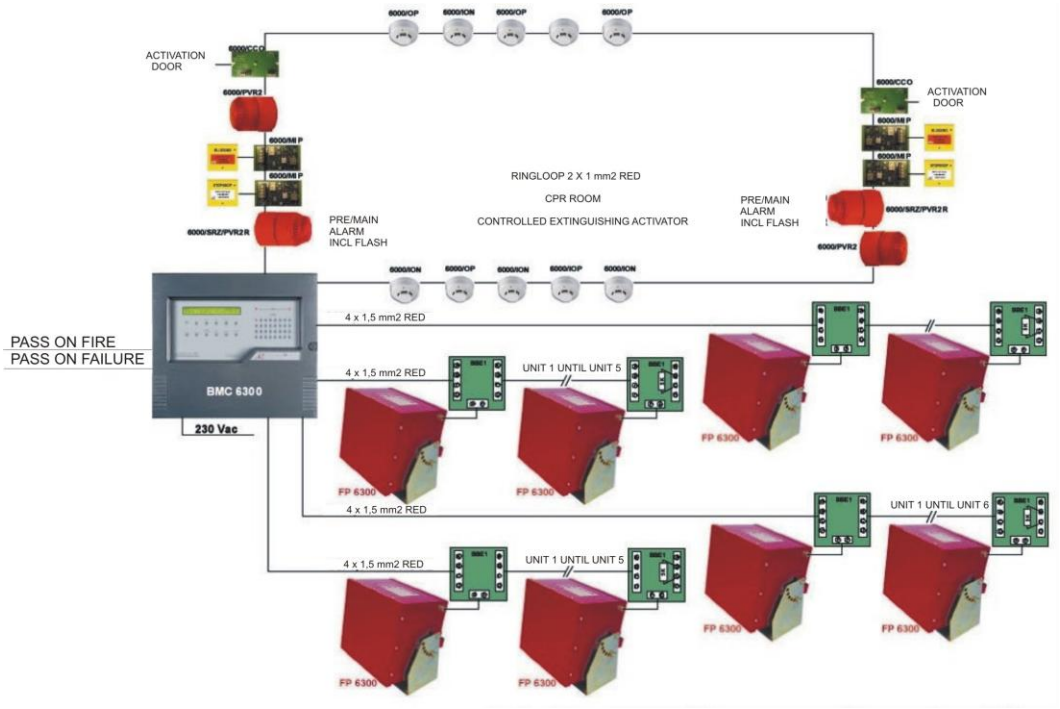
If the control current does exceed 5 mA, this can result in the activation of the aerosol fire extinguisher.

10.1 General Guidelines For Installation of Fixed System

Fire detection and alarm/evacuation installation

Basic principles :

- Building Decree
- Model building regulations
- NEN-6082 et seq.
- NEN-2535: 1996, 'Fire safety of buildings. Fire alarm systems'
- NEN-2535-A1:2002 Amendment Sheet
- NEN-EN 54 parts 1 to 14, with regard to fire alarm equipment.
- NEN-2654, fire alarm systems, management, control and maintenance requirements.
- "Installing a fireproof building" 2nd edition of the Dutch Fire Brigade Federation or equivalent].
- European low voltage and EMC directives (CE mark)
- NEN-2575: 2000 Fire safety of buildings – Evacuation installations – System and quality requirements and guidelines for siting
- Any standards or directives other than those mentioned above that must be observed in the country where **FirePro®** is installed.



10.2 General

To give users the opportunity to evacuate the building promptly when a fire is in its early stages or to report it to the fire brigade, a number of technical installations must be installed in the building for this purpose.

The performance requirements of the fire detection and alarm/evacuation installation must be clearly formulated in accordance with section 4.1 of NEN-2535.

The execution drawings, description and any certificates of the installations referred to in this report must be submitted in detail to the municipal authorities for approval before the installation is installed.

Performance requirement : nuisance and false fire alarms, depending on the type of building
in accordance with NEN-2535: §4.3.2 or equivalent
Performance requirement : for system availability, depending on the project

Detector siting in accordance with NEN-2535 or equivalent with a two-detector dependence for the prevention of unwanted extinguishing by the extinguishing system.
If compartmentalised extinguishing must take place within the same room, allowance will have to be made for the detection. Here detection must be by means of thermomaximal or thermodifferential detectors (fire size 7: NEN-2535 or equivalent).

Once there has been a calculation of the number of ***FirePro®*** units and of the types to be installed for the protection of a given volume or object (see calculation method), it is important for the correct location of the fire extinguishers to be determined.

The units can be installed on walls or (suspended) ceilings, in cubicles, etc. For vertical installation on walls there must be a safe distance of at least one metre from gangways, racks or objects. For the larger types of ***FirePro®*** units there must be a greater distance. The same applies for horizontal installation on ceilings; in this case lateral distances must always be taken into account.

Do not install any ***FirePro®*** units between the possible place of combustion and points by way of which the excess pressure of the objects can disappear: doors, skylights, man-holes, windows, covers, etc. (see Figure 3). The installation of ***FirePro®*** units in the vicinity of openings is not recommended.

FirePro® units that are used for the protection of specific objects must be installed so that during the operation of the extinguisher the room can be filled with the extinguishing aerosol from the underside of the object.

The optimum distance from the floor of the protected volume to ***FirePro®*** units is shown by way of the flow parameters in the catalogue with technical information. The discharge of the aerosol may not be impeded by objects at the exit membrane of the aerosol fire extinguisher (see table “technical information”, heading “discharge”, page 39).

Note:

It is also important that, if there are objects placed too close to the discharge opening, they may be damaged by a high aerosol temperature. To prevent damage to objects steps must be taken to ensure that a safe distance is maintained in a straight line from the aerosol discharge opening. This can be derived from a table called "temperature and activation time". In this table temperature is plotted against distance. This is for each model.

Important: Ensure that no dirt, oil, corrosive substances and other contaminants can find their way into the ***FirePro®*** units. Nor may the thermocord become dirty.

The ***FirePro®*** units must be placed in the room in such a way that in the event of fire the aerosol flow does not form an obstruction to the evacuation of personnel. The room in which the fire detection and fire alarm control unit and fire brigade panel are set up must be equipped with general lighting with a lighting intensity of not less than 100 and not more than 500 lux and emergency lighting with an intensity of not less than 1 and not more than 10 lux (or other specifications if given by the local guidelines).

The fire detection and fire alarm control unit must comply with EN54 parts 2 and 4, to be demonstrated by means of a product certificate from an accredited European certification body (or in accordance with local guidelines).

The function of the control switches (push buttons), signal lamps and all the relevant inscriptions and texts must be applied clearly, permanently non-erasable and in the language of the user. The inscriptions must be clearly legible at a distance of 80 cm. The control functions of the fire detection and fire alarm control unit that have fundamental consequences for the operation of the system, such as the switching off of detector loops, switching on/off of delayed transmission, etc, may not be operated by unauthorised persons.

If a manual switch is installed for the electrical activation, its location must be accessible. It must also be in a place where it is impossible to activate it accidentally.

Important: If more than one ***FirePro®*** unit is used, it must be connected to the electrical power supply in parallel (see Fig. 4).

Provision must also be made for fusing the electrical circuit with a suitable fuse to prevent damage by short circuiting following activation. The fuse must be placed after the control panel or after the manually operated extinguishing knob.

Evacuation alarm emitters must be installed throughout the object, the sound level at any particular point being a minimum of 6 and a maximum of 20 Db(A) above the ambient sound level.

10.3 Emergency Fire Detection and Fire Alarm System Power Supply

The fire detection and fire alarm system must be connected to a separate end group, which is provided with the notice:

"DO NOT SWITCH OFF FIRE DETECTION & FIRE ALARM SYSTEM"

The fire detection and fire alarm system must be equipped with its own emergency power supply, consisting of a battery charging circuit and batteries. The fire detection and fire alarm control unit (BMC) must also have primary and secondary power supply (emergency power supply) monitoring; faults in the power supply must be reported both visually and acoustically.

The primary power supply and emergency power supply of the BMC must be calculated so that the entire installation including the equipment to be operated is fed.

The primary power supply and emergency power supply of the common fire detection and fire alarm system must have sufficient power :

- For the flashlight (which indicates the fire brigade entrance)
- For the slow whoops (the evacuation installation)
- For the transmission equipment (if this is not equipped with its own emergency power)

Important: if the standard power supply/emergency power supply is not sufficient, then expand the emergency power supply.

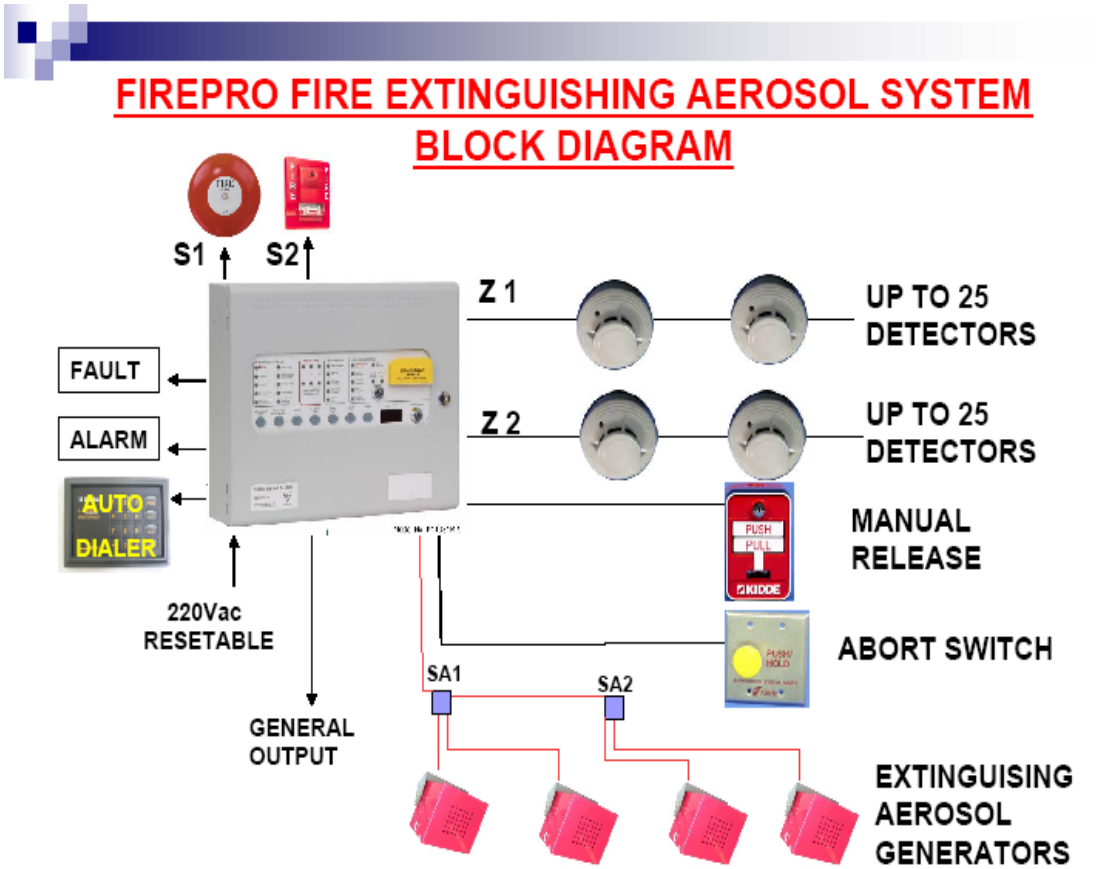
The emergency power supply of the BMC must be laid out on the basis of:

- The maintenance contact according to NEN-2654;
- Automatic fault transmission to a 24-hour monitored alarm post within 30 minutes;
- Autonomy time emergency power supply for evacuation alarm is 23.5 hours at rest and 30 minutes in alarm condition;
- Rectification of fault by the fire detection company must be guaranteed within 24 hours.

The emergency power supply of the common fire detection and fire alarm system must be capable of simultaneously:

- Feeding the flashlight for 30 minutes;
- Feeding the slow whoops;
- Activating all the connected ***FirePro®*** units.

Important: Battery ageing must be taken into account when determining the necessary battery capacity (use only approved batteries).



11.0 Installation Procedure

The **FirePro®** units are fixed using brackets. For **FirePro®** units with a discharge opening on one side, the brackets must be guided over the middle of the container. For **FirePro®** units with a discharge opening on two sides, two matching brackets are used which are fixed on the container at a distance of ¼ of the overall length of the container from each end. Tighten the bracket clamping bolts.

Important: In the case of installations in rooms where vibrations can occur, because of motors for example, the units must be fixed to a vibration-free base. Examples include rubber blocks or other similar materials.

Ensure that the FirePro® unit is properly secured.

Before starting on the installation of the **FirePro®** units, check that all the parts required have been supplied.

Then go to work in this order:
a) connect the wires to the terminals of the **FirePro®** unit through a fuse;
b) connect the wires to the parts of the fire extinguishing system;
c) finally connect wires to the power supply.

Following completion of the work check that the **FirePro®** units have been installed correctly, that is, that all the requirements in the installation instructions have been met. If required, you must record the installation on the installation certificate or in the technical documentation of the protected object. The distributor reserves the right to inspect the installation. The installer is at all times obliged to cooperate with this.

11.1 Cabling/Installation

The cabling for the outgoing controls to the fire protection installation comes under the activities of the installer.

Note: the execution must conform to NEN-2535 and NEN-1010:5th edition.

Fixed cabling for main current (230 V) must have a minimum conductor cross section of 1.5 mm. The cabling must be of flame retardant construction (NEN-1010), provided that no function retention is required. All the cables that are part of the fire detection and fire alarm system and evacuation installation must be red or be marked red every five metres. Cables in a terminal box must be provided with a loop, group and cable number.

Only lay cabling in a conduit or a compartmentalised cable duct:

- In cable ducts a division plate or 50 mm spacing is required between the fire detection and fire alarm system cabling and the 230/380 V power current cabling;
- In cable ducts control current cabling may be laid with fire detection and fire alarm cabling if no disruptive mutual interference is to be expected;
- Conduit must connect to the cable duct;
- Open bends, maximum 50 x 50 mm, are only permitted above suspended ceilings and beneath raised floors;
- Protect conduits emerging from floors with impact-resistant conduit to 10 cm above the floor.

Where cabling is laid directly alongside power current cabling, for example next to motor cables of an air conditioning system, then use screened or twisted cabling, lay in separate compartments or keep a minimum of 50 mm spacing between power current cabling and fire detection and fire alarm cabling.

Where cabling is laid through fire-resistant partitions, suitable measures must be taken to ensure that the fire/smoke-resistance of the partition is not impaired.
The wiring, technology and tools used must be used according to the requirements of approved workmanship, with the aim of minimising the chance of failure. Do not include any conductors in the fire detection and fire alarm system cabling that are fed from other installations.

There may not be any joints in transmission paths, unless in consultation with the fire detection company and the local fire brigade. The joints must then be made in terminal boxes intended for the purpose. Any joints necessary must be housed in a completely sealed junction box. The conductors must be connected to the terminal strips with numbered screw terminals.

11.2 Function Retention Cabling

The installation and the route of the cabling must be chosen so that the chance of damage of the cabling by fire is prevented and/or is as small as possible.

This can be achieved by:
- Laying in the ground.
- Laying in a minimum of separate 30 minutes fire-resistant ducts.
- Use of fire-resistant cabling (cabling must conform to DIN 4102 Part 12 class E 30).

The following cables are concerned:
- Between the fire detection and fire alarm control unit and signal transmitters (slow whoop and flashlight).
- Between the fire detection and fire alarm control unit and the transmission equipment.
- Between the fire detection and fire alarm control unit and the fire brigade panel and any additional panels.
- Between the fire detection and fire alarm control unit and any control that automatically resets when the BMC is reset.

The cable support of cables for which function retention is required must also remain functional for 30 minutes in the event of fire.

11.3 Cable Monitoring

Cable monitoring according to NEN-2535
In addition, the following cabling must be provided with cable monitoring:
- Cabling to the transmission equipment if longer than 1.5 m.
- Cabling to the ***FirePro®*** unit.
- Slow whoop.

For ***FirePro®*** units that are equipped with the thermocord the following properties apply:
The ***FirePro®*** units can be supplied with thermocord. The thermocord can be connected to the activation unit or be installed in itself.

If so desired different ***FirePro®*** units can be installed and be connected to a network of thermocords.

The thermocord can be supplied with or without protective wire braiding.
The thermocord is installed on the wall of the protected volume with clamps intended for the purpose.

The first clamp must be installed on the ***FirePro®*** unit. Spread out the other clamps at uniform intervals along the entire length of the thermocord.

The thermocord must be installed so that it has no bends with a radius of less than 20 mm.

Keep the mechanical pressure on the cord and the protective wire braiding limited. Feed the thermocord over the wall in such a way that any chance of (accidental) damage at a later time can be prevented.

11.4 Shutdown of Energy Supply and Computers

The activation system of the **FirePro®** units is to be planned so that the following expectations/conditions are met:

- The ventilation system of the room to be protected must be shut down before the **FirePro®** system is activated. The power supply to the equipment/installation must also be shut down so that the ventilation and/or blowing function of the equipment is stopped. In this situation the fire cannot spread by means of extra oxygen and the extinguishing agent can reach the fire with guaranteed swiftness and in the desired concentration and extinguish it efficiently.
- The shutdown system for the power supply also guarantees that there is no short circuiting following activation. Any additional fire risk is prevented by the shutdown system.
- The shutdown system for the power supply and ventilation is connected to the fire detection and fire alarm system and/or fire alarm panel.

12.0 Installation, Installation Tests, Delivery, Inspection and Maintenance

12.1 Installation

The Schedule of Requirements with the execution drawings and any other relevant descriptions and/or certificates of the fire detection and fire alarm system must, before the installation is installed, have been approved by the local authority. Usually this will be the local chief fire officer of the municipality in which your business is located.

The fire detection and fire alarm system can be supplied and also maintained by the authorised **FirePro®** dealer or by a fire detection company that has been certified by a member of the NCP (National Centre for Prevention) or an equivalent of this body.

The fire detection and fire alarm system must be installed by an expert and recognised installer. The installer must work in accordance with the requirements of certification under the responsibility of the authorised **FirePro®** dealer or the fire detection company (supplier of the fire detection and fire alarm system).

The authorised **FirePro®** dealer, the installer and the specialised fire detection company may depart from the provisions of this schedule of requirements, if and in so far as approval has been granted by all the required parties and the author has drafted revisions for this schedule and has been correctly informed to this effect.

Where the schedule of requirements differs from prevailing standards/directives, the schedule of requirements shall prevail. The installer must ensure that before the start of work the design and the siting of the installation has the approval of the local authorities, customer and owner.

Following acceptance of order, on the basis of perusal of the respective (definitive) text and drawing of this schedule of requirements, the authorised **FirePro®** dealer and/or the specialised fire detection company is responsible for the design and the installation of the fire detection and fire alarm system.

If and in so far as can subsequently be concluded that the actual situation differs or has become different from that on which the schedule of requirements is based, in particular where the intended use of the rooms is concerned, the owner/user of the installation and/or whoever installs the fire detection and fire alarm system must adapt the fire detection and fire alarm system to the newly arisen situation. For this purpose too advice can be obtained from FirePro Systems Ltd.

In the event of any subsequent modification (including structural) of layout having an impact on the speed and reliability of fire detection and the fire alarm, the fire risk and/or on the chance of nuisance alarm/fault, consideration must again be given to whether an adjustment of the fire detection and fire alarm system is necessary and/or required (such as detector siting and detector choice). Any adjustment, for the above reasons, must be approved by all the parties concerned and/or required. This approval must be incorporated into the schedule of requirements.

Important: If and in so far as the manufacturer's installation instructions differ from the schedule of requirements, for a careful implementation of the ***FirePro®*** products contact must first be made with FirePro Systems Ltd. Primarily the installation instructions of the manufacturers and/or fire detection and firm alarm control unit and/or detection material must be followed.

12.2 Installation Tests and Delivery

Following commissioning and installation an attestation (a written confirmation of approval) stating that the installation is working properly and conforms to all the technical descriptions must be issued by the installer/the fire detection company. At the time of delivery the fire detection company must supply the materials required for testing the detectors used.

12.3 Maintenance and Inspection

During the period that the ***FirePro®*** units are in use the following inspections and maintenance procedures must be carried out:

- A periodic inspection of the aerosol fire extinguishers and fire extinguishing systems to check the following parts:

  1 – electrical wiring
  2 – electrical circuit
  3 – thermocord
  4 – terminals of the electrical activator
  5 – electrical contacts
  6 – fixing bolts

At the time of the final inspection the following documents must be issued:

- Schedule of Requirements
- Installation attestation conforming to NEN-2535 (or any other equivalent local standard)
- Brief and concise operating instructions, approved by the fire brigade
- Logbook of the fire detection and fire alarm system
- Revision drawings in triplicate with all the relevant details
- A signed maintenance contract

The authorised ***FirePro®*** dealer must provide a separate quotation for inspection, management and maintenance of the ***FirePro®***-based installation. The installer of the fire detection company must alert the customer to its obligation to carry out limited functional installation tests and maintenance, including a monthly functional test of the installation and transmission. This must be in accordance with NEN-2654 (or an equivalent local directive). The customer must ensure that this task is undertaken by a suitably trained officer under NEN-2654 (or an equivalent local directive).

The customer/user is obliged to conclude a maintenance contract in accordance with NEN-2654 (or an equivalent local directive) with the authorised ***FirePro®*** dealer. This maintenance can for example stipulate that the installation be inspected and maintained annually.

The maintenance contract must state:

- that the maintenance will be in accordance with NEN-2654 (or an equivalent local directive)
- that maintenance will be undertaken during the life of the installation

- that the service provider will start on the rectification of a fault within 24 hours of receipt of a fault report
- and urgent interventions must also be included in the maintenance contract

The suitably trained officer of the authorised **FirePro®** dealer or the customer/user must keep a logbook, recording all the relevant events concerning the installation, such as false and nuisance alarms with any cause, switching off of detectors, detector groups, maintenance, inspections and installation tests, adjustments, expansions and repairs. Other areas of attention are:

- A periodic test (see life) for type E models; electrical activation must be carried out to check that the internal electrical circuit of the activator is intact. This test must be carried out with an ohmmeter with an accuracy of at least 2.5 ohm.The control current may not exceed 5 mA (milliampère).
- All the electrical wires and connections of the **FirePro®** units to the control panel or the switch must also be tested and checked.
- A periodic inspection of the thermocord (see life) of the type TH models must be carried out to check that the thermocord and the connections to the aerosol fire extinguishers and/or fire extinguishing systems are intact. Any damaged parts must be replaced and reconnected.
- A periodic inspection of the metal caising (see life) of the solid extinguishing agent must be carried out to check whether the material is intact or has been damaged by chemically aggressive materials or corrosion.Whenever such inspection indicates that the metal casing has been damaged, the unit shall be replaced.
- All the metal brackets and connecting bolts must be inspected and tightened.
- Thanks to its chemical composition and properties the aerosol-forming extinguishing compound SBK (Solid Bound Compound) in the **FirePro®** units does not require any further maintenance throughout its life.
- Life Time: the Certified Life Time of the **FirePro®** units is 15 years.

Logbook

The logbook contains the items required that give a picture and provide for the recording of various things during the life of the installation. In the logbook you will find the following:

Content of logbook:

- Introduction
- General details
- Devices used
- Management and maintenance requirements
- Measures on system activation
- Measures following system activation
- General rules and regulations for the user

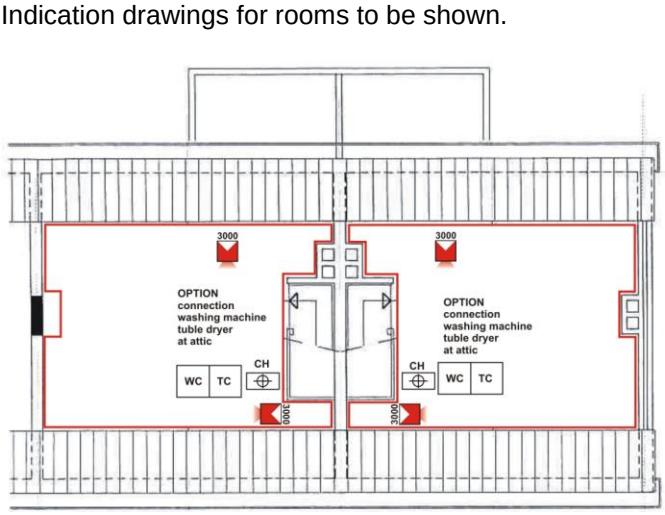
In the appendices:

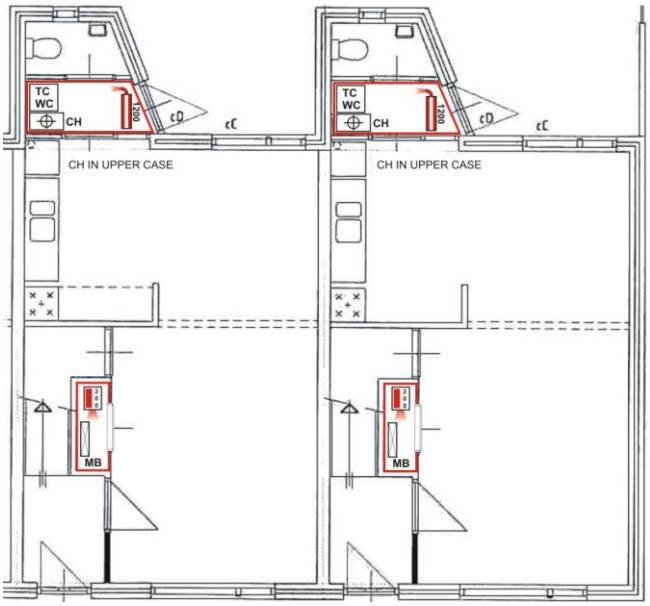
- Periodic checks trained person
- Periodic check by maintenance expert
- Overview of automatic fire extinguishing system statistics
- Overview of periodic checks and preventive maintenance
- Overview of real fire statistics
- Overview of nuisance fire alarms
- Overview of false fire alarms
- Overview of system availability
- Safety information sheet
- Technical data **FirePro®** units
- Certificate of delivery
- Installation drawings
- Schematic diagrams
- User instructions for BMC (fire detection and fire alarm control unit)
- Inspection reports

12.4 Drawings and Pictograms

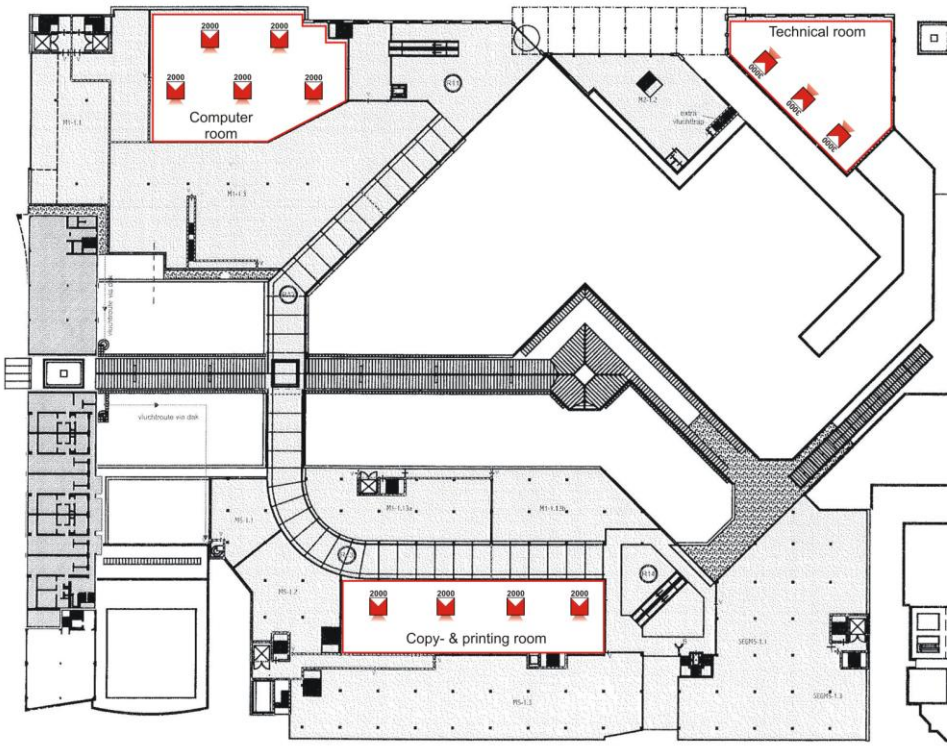
When drafting the technical drawings work to scale and clearly indicate the rooms to be protected.

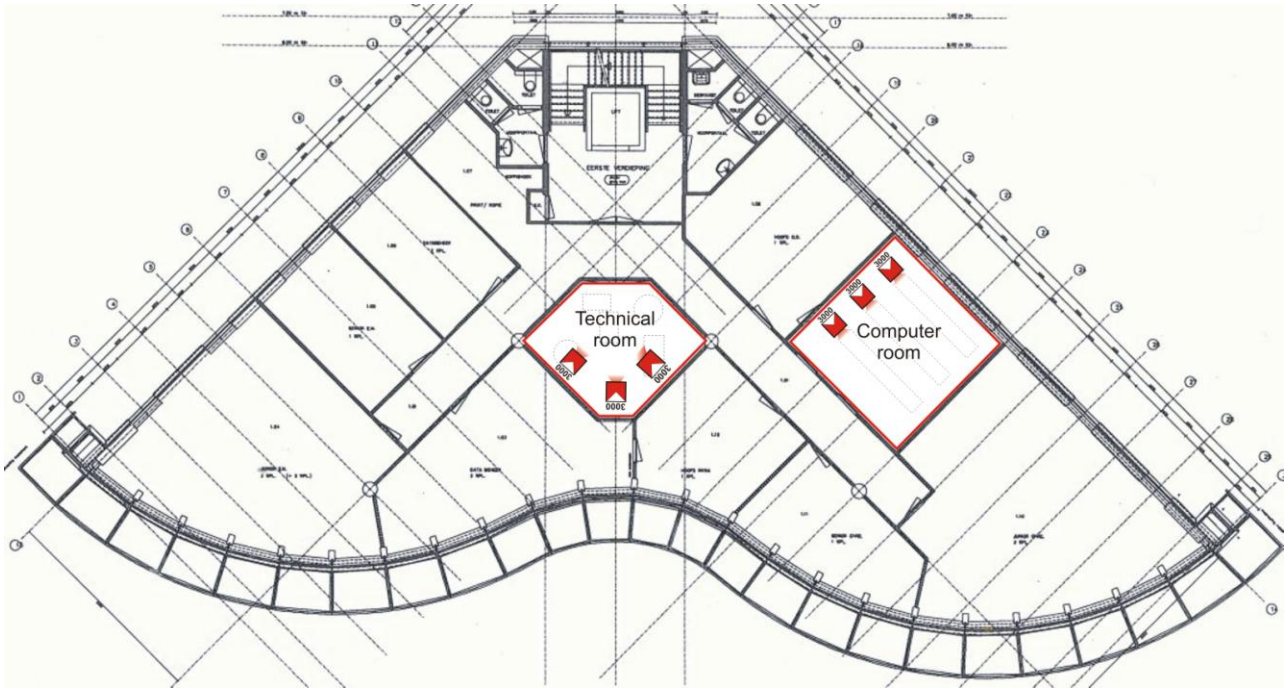
Indication drawings for rooms to be shown.





Important: Use the correct pictograms in the siting and the ultimate overviews.





When making installation drawings and/or indications on situation diagrams and/or (evacuation) plans the pictograms below must be used.

FP - 8 / TH

FB - 1 / TH

FB - 2 / TH

FP - 20 / TH

FP - 20B / TH

FP - 80 / TH - E

FP - 100 / TH - E

FP - 200 / TH - E

FP - 200 / M

FP - 500 / TH - E

FP - 1000 / M

FP - 1200C / TH - E

FP - 2000 / TH - E

FP - 3000 / TH - E

FP - 6300C / TH - E

FP - PCSU / E

13.0 Residue, Removal, Dismantling of Units, Waste and Environment

13.1 Residue

During the activation process the SBK changes into a swiftly spreading aerosol, consisting of solid particles that are suspended in the gas phase. The size of these particles is a few micrometres/nanometres.
The composition of the ***FirePro®*** aerosol, consisting of potassium compounds, is, in the intended concentration, not corrosive, not electrically conductive and does not cause any damage to the equipment protected. The ***FirePro®*** aerosol-forming compound is not based on halogen compounds to react with the fire. It does not produce any corrosive halogen acid by-products in its reaction with the fire.

The concentration of solid particles suspended in the aerosol phase is a few milligrams per m³. The particles are free from water and moisture and after a given period of time settle as dust in the protected room. The dust can easily be removed during cleaning before it absorbs moisture.

Regarding the side effects of fire following the extinguishing, which mainly consist of KOH in a very low concentration (which again reacts with CO_2 and rapidly change into K2CO3) and are also free from water and/or moisture, the same considerations are applicable to the aerosol particles.

If the aerosol particles are removed by cleaning shortly before they can absorb moisture and the mix of combustion residues present in the air after the fire, they do not react to electronic components, metal etc. Where the dust particles remain for a lengthy period, they can absorb moisture, meaning that the moisture will react with metal (especially unpainted) so that oxidation could occur.

Important !

When extinguishing gases liquefied under pressure are sprayed in the room cooling takes place. In the case of aerosol-forming units the temperature can rise. Both processes affect the humidity. It is therefore important to be aware of the humidity present beforehand. Following fire and/or activation of the extinguishing system the humidity in the room must be reduced as soon as possible.

13.2 Guidelines for the Removal of the Residue

Note:

- Remove the residue shortly after activation (within max. a few hours).
- Use a damp cloth or brush to mop up the dry residue from the floor and/or metals.
- Use a fan to remove the residue from electrical components.
- Use special sprays that are suitable for removing/cleaning the residue from electronic components.

Important: following a genuine and/or nuisance activation of the ***FirePro®*** unit(s), you must always contact your dealer who can help you with a new survey of the room concerned and the correct reconditioning or cleaning methodologies.

13.3 Dismantling

When the **FirePro®** units have to be dismantled, the following steps must be taken:

- completely switch off the drive from the fire detection system and ensure that it cannot be switched on;

- undo the power supply wires and/or the thermocord on the **FirePro®** unit and ensure that they cannot be connected;

- ensure that you are standing firmly and adhere to the rules for working at height (Working Conditions Act);

- undo the **FirePro®** unit by undoing the bolts and nuts;

- carefully remove the unit from the bracket and place it on a stable surface;

- after dismantling the **FirePro®** unit(s), put the fire detection and alarm installation back into operation in consultation with the manager;

- if the **FirePro®** unit is still warm following activation, use heat-resistant gloves.

13.4 Waste and Environment

When the **FirePro®** units have been activated they can be disposed of as normal waste following dismantling. When the **FirePro®** units have not been activated and the extinguishing agent remains in them, they must be surrendered to the Distributor and/or its Dealers.

14.0 Material Safety Data Sheet

1.	**Identification of the Substance/Company**	
1.1	Trade name	: FirePro®
1.2	Manufacturer/Supplier	: FirePro Systems Ltd./Celanova Limited 6, Koumandarias & Spyrou Araouzou Str., Tonia Court II, 6ht Floor Limassol - 3076 , Cyprus Phone : 00357-25-379999 Fax : 00357-25-354432 e-mail : mail@firepro.info website : www.firepro.info
1.3	Telephone number in case of emergency: + 357-25-379999	

2.	**Composition/Information on Ingredients**				
2.1	Component	Wt.%	CAS No.	EINECS	Class, R and S phrases
	Potassium Nitrate	77	7757-79-1	231-818-8	See section 15
	Potassium Carbonate	4	584-08-7	209-529-3	See section 15
	Magnesium	<1	7439-95-4	231-104-6	See section 15
	Epoxy Resin Polymer	18	25068-38-6	any “polimerizate, polycondensate, or polyadduct” is exempted by 81/437/EEG	See section 15

3.	**Hazards Identification** - Hazards for humans related to the SBK solid compound has not been found. - Hazards for humans related to the aerosol released by the solid compound have not been established because TLV’s are not applicable. - Signs and symptoms related to the aerosol phase are only referred to acute exposure and/or chronic overexposures, while in real life the exposure will be very short (i.e. in the event of an accidental discharge when people were not evacuated on time).	
3.1	For humans	
	Threshold Limit Values	: None established
	Signs and Symptoms by acute exposure	
	Eye Contact Inhalation Skin Contact Ingestion Chronic Overexposure Medical Conditions Generally Aggravated by Exposure For Environment	: At normal contact no injury : Not a likely route of entry : At normal contact no injury : At normal contact no injury : At normal contact no injury : None known : None established

4.	**First-Aid Measures** First-Aid measures are referred to acute exposure and/or chronic over exposure	
4.1	Inhalation Eye Contact Skin Contact Ingestion	: Remove from exposure area to fresh air. : If necessary wash eyes. : Change clothing and shoes. Wash skin with soap. : Not likely.

5.	**Fire fighting Measures**	
5.1	Extinguishing Media	: This is an Extinguishing Agent
5.2	Unusual Fire and Explosion Hazards	: The material does not present an explosion danger. It can be ignited by means of a fire. Hot aerosol is present in the close up area of the outlets
5.3	Special Procedures	: In places where there is a fire always wear personal protecting equipment and clothing

6.	**Accidental Release Measures**	
6.1	Personal Precautions	
	Respiratory Protection Hand Protection Eye Protection Skin and Body Protection	: at normal contact not needed : at normal contact not needed : at normal contact not needed : at normal contact not needed
6.2	Environmental Precautions	
	Waste Disposal Methods	: See section 13
6.3	Clean up Precautions	: Sweep up

7.	**Handling and storage**	
7.1	Handling Precautions	: Avoid contact with combustible materials.
7.2	Storage Precautions Storage Class	: Should be stored in original container. Keep dry. : 9 miscellaneous , solid

8.	**Exposure Controls and Personal Protection**	
8.1	Exposure	: Before entering a room with the material in aerosol phase vent properly to avoid unnecessary exposure.
8.2	Personal protection	
	Respiratory Protection Hand Protection Eye Protection Skin and Body Protection	: at normal contact not needed : at normal contact not needed : at normal contact not needed : at normal contact not needed

9.	**Physical and Chemical Characteristics**	
9.1	Appearance Colour Odour Relative Density Solubility in water Ph (if in water, % Conc.) Boiling Point Vapour Pressure (mm Hg) Vapour Density Flash Point Flammability Limits in Air (% by volume) Auto Flammability Explosive Properties Oxidizing Properties	: Solid : Off white : None : Not applicable : Insoluble : Not determined : Not applicable : Not applicable : Not applicable : Not applicable : Not applicable : Not applicable : Not applicable : Not determined

10.	**Stability and Reactivity**	
10.1	Stability Conditions to avoid	: Stable : None known
10.2	Hazardous Reactions Conditions to avoid	: Will not occur : None known
10.3	Materials to Avoid	: None known
10.4	Hazardous Decompositions Products	: None ascertained

11.	**Toxicological Information**		
	The TLV's (Treshold Limit Values) of the chemicals released in the aerosol phase are applicable only in case of long, as long as a complete professional life, exposure. This is not the case of a real life situation.		
11.1	Product		
	The potential damage is not caused by the product mixture composition, but by the fact that it is respirable. The TLV's apply in case of long exposure, sometimes exposure during a complete professional life, whilst in this case is once only and short (in case of accidental discharge when evacuation does not take place on time).		
	In case of fire the toxicity is caused by the fire itself and the products involved in the fire.		
11.2	Components		
	Potassium Nitrate	Toxicity Target Organs	: Oral LD_{50} (rat) 3750 mg/Kg : Blood, central nervous system
	Potassium Carbonate	Toxicity Target Organs	: Oral LD_{50} (rat) 1870 mg/Kg / Oral LD_{50} (mouse) 2570 mg/Kg : Respiratory system
	Magnesium	Toxicity Target Organs	: Oral LD_{50} (dog) 230 mg/Kg : Central nervous system, liver, kidneys
	Epoxy Resin Polymer	Toxicity Irritation Data	: Oral LD_{50} (rat) 11.4 g/Kg : Skin (guinea pig) 2750 mg/55 days Inert Eye (rabbit) 100 mg Mild

12.	**Ecological Information**	
12.1	Mobility Absorption/Desorption	: with present data no problems : with present data no problems
12.2	Degradability Biotic and Abiotic Degradation Aerobic and Anaerobic Degradation Persistence	: with present data no problems : with present data no problems : with present data no problems : with present data no problems
12.3	Accumulation Bioaccumulation Potential Biomagnification	: with present data no problems : with present data no problems : with present data no problems
12.3	Short and Long Term Effects on	
	Ecotoxicity Aquatic Organisms Soil Organisms Plants and Terrestrial animals	: with present data no problems : with present data no problems : with present data no problems : with present data no problems
12.4	Other Adverse Effects	
	Ozone Depleting Potential (ODP) Photochemical Ozone Creation Potential Global Warming Potentials (GWP) Effects on Waste Water Treatment Plants	: none : none : none : with present data no problems

13.	**Disposal Considerations**
13.1	Dispose of in Compliance with local, state and national regulations.

14.	**Transportation Information**	
14.1	Hazard Class or Division	: 9 miscellaneous, solid : For additional transport information contact FirePro Systems Ltd / Celanova Limited

15. Regulatory Information

For 15.1 Components:
The EU classification and R&S phrases, referred to the components of the SBK compound are related only to the single components considered as separate chemical entities. Once mixed in the production of the SBK compound, the risk sentences of the single components are not applicable being the SBK compound a separate chemical entity.

15.1 Product

Potassium Nitrate	EU Classification R Phrases S Phrases 	Oxidizer 8 16 41	- Contact with combustible material may cause fire Keep away from sources of ignition – No smoking In case of fire and/or explosion, do not breathe fumes
Potassium Carbonate	EU Classification R Phrases S Phrases 	Irritant 22 36/37/38 26 37/39	- Harmful if swallowed Irritating to eyes, respiratory system and skin In case of contact with eyes, rinse immediately with plenty of water and seek medical advice Wear suitable gloves and eye/face protection
Magnesium	EU Classification R Phrases S Phrases 	Flammable 15 17 2 43 7/8	- Contact with water liberates highly flammable gases Spontaneously flammable in air Keep out of reach of children In case of fire never use water Keep container tightly closed and dry
Epoxy Resin Polymer	EU Classification R Phrases S Phrases 	Irritant 36/38 43 53 28 37/39 61	- Irritating to eyes and skin May cause sensitisation by skin contact May cause long-term adverse effects in the aquatic environment In case of contact with skin, rinse with water Wear suitable gloves and eye/face protection Avoid release to the environment. Refer to special instructions/ Safety Data Sheets
Limit Values for Exposure EINECS Status Restrictions on Marketing and Use	: None listed : All components are included in EINECS inventories : None (Refer to any other national measures that may be relevant)		

16. Other Information

16.1 None Known

17. Disclaimer

17.1 The data in the above material safety data sheet reflect the current state of knowledge of our product and shall be used only as a guideline. No binding statements as to the contractually agreed product characteristics may be inferred there from.

15.0 Alphabetical Technical Glossary

This information, instruction and user manual contains technical terms, the most important of which appear in the list below in alphabetical order with a brief explanation. The "page" column gives the page on which the term is used for the first time.

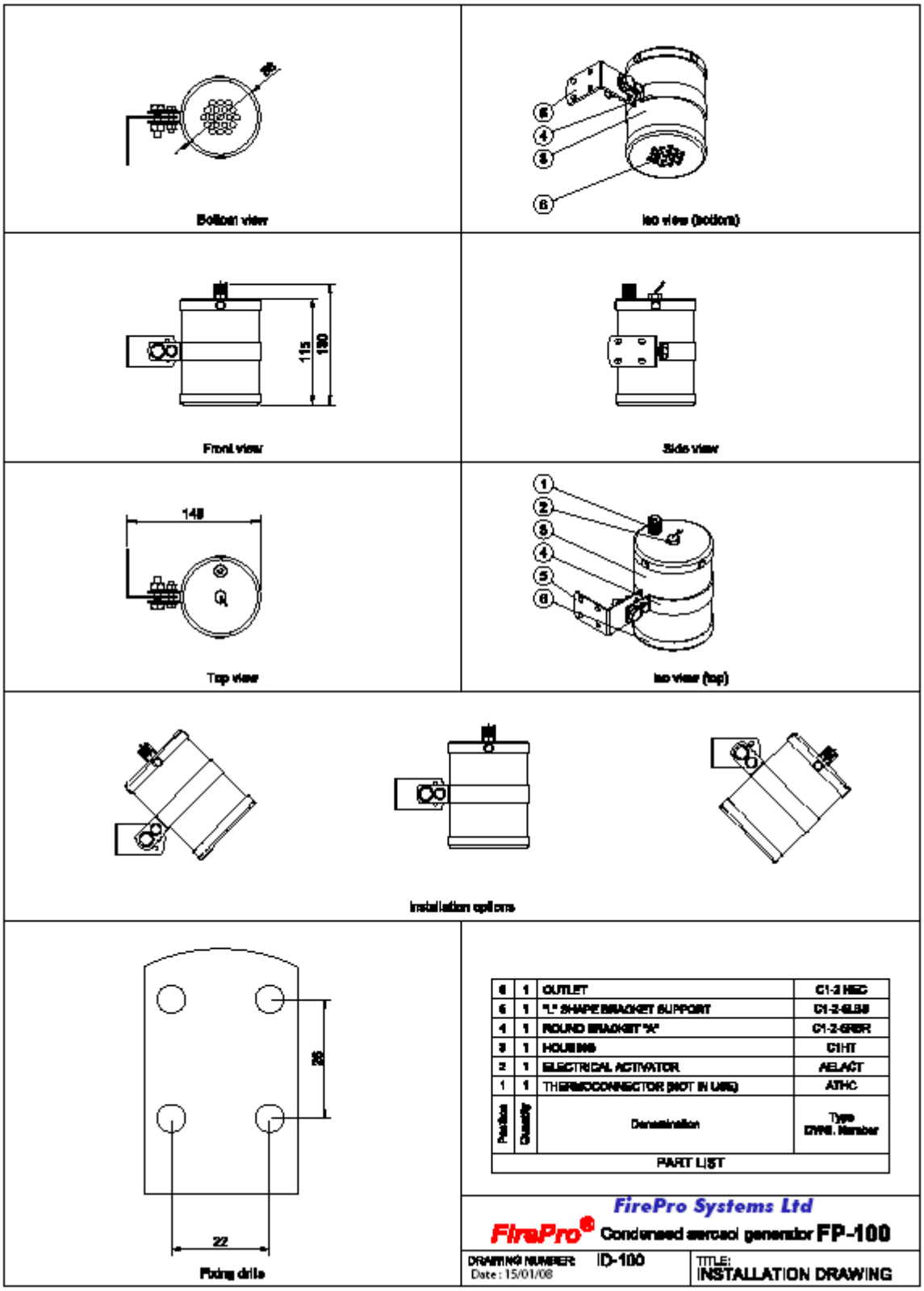
	TERM	EXPLANATION	PAGE
A	activator	part that puts the unit into operation	16
	activation	the putting of extinguishing unit and/or installation into operation	15
	aero	air	5
	aerosol	small particle in homogeneous diffusion in the air	
	ATEX directive	rules for use of electrical equipment in NPR/CPR rooms	16
	Atmospheric pressure	existing or built up pressure in a closed room	33
B	BMC	fire detection and fire alarm control unit/control system	51
	building decree	legislation concerning building engineering aspects for buildings	49
	building regulations	regulations concerning building engineering aspects for buildings	49
C	cable monitoring	system that monitors the functionality of power cables	54
	calculation	calculation of units that have clarity as their purpose	33
	calculation factors	min. items laid down that must be included in calculation	33
	calculation sheet	laid down calculation methodology and report form	34
	cm	centimetres (size indication)	28
	colloids	small particles that are suspended in another substance or gas	5
	compartment	enclosed space with fixed dimensions in which extinguishing must take place	35
	component	part of extinguishing unit and/or installation to be used	2
	connector	connecting point between two units	21
	conical nozzle	head that can be placed on extinguisher for better diffusion of the extinguishing agent	21
	control switch	button for effecting manual extinguishing	21
	control system	system that puts (an)other system(s) into operation following activation	51
	core fires	fires within solid substances	35
D	Db(A)	sound intensity expressed in decibels	51
	detector siting	location of fire detector connected to the fire detection and fire alarm control unit	2
	DIN	German standard based on EN (European Standard)	54
	discharge duration	duration of discharge of extinguishing agent	36
	discharge length	length between extinguisher and achievable distance of the discharging extinguishing agent	35
	discharge opening	opening through which the extinguishing agent discharges	21
	discharge temp.	temperature of the discharging extinguishing agent	35
	dispersion	the distribution of a substance	5
	detection	the detection of preset values	2
	detection system	system for detecting fires	14
	detectors	part of detection system	41
E	electrical impulse	current by which the activator puts the extinguisher into operation	41
	element	part of extinguishing unit	6
	EMC directive	electromagnetic compatibility	49
	emergency power supply	supply that temporarily takes over the function in the event of power failure	34
	evacuation instal-lation	computer-controlled system that provides for visual/acoustic signal	49
	exothermic	reaction in which heat is released	47

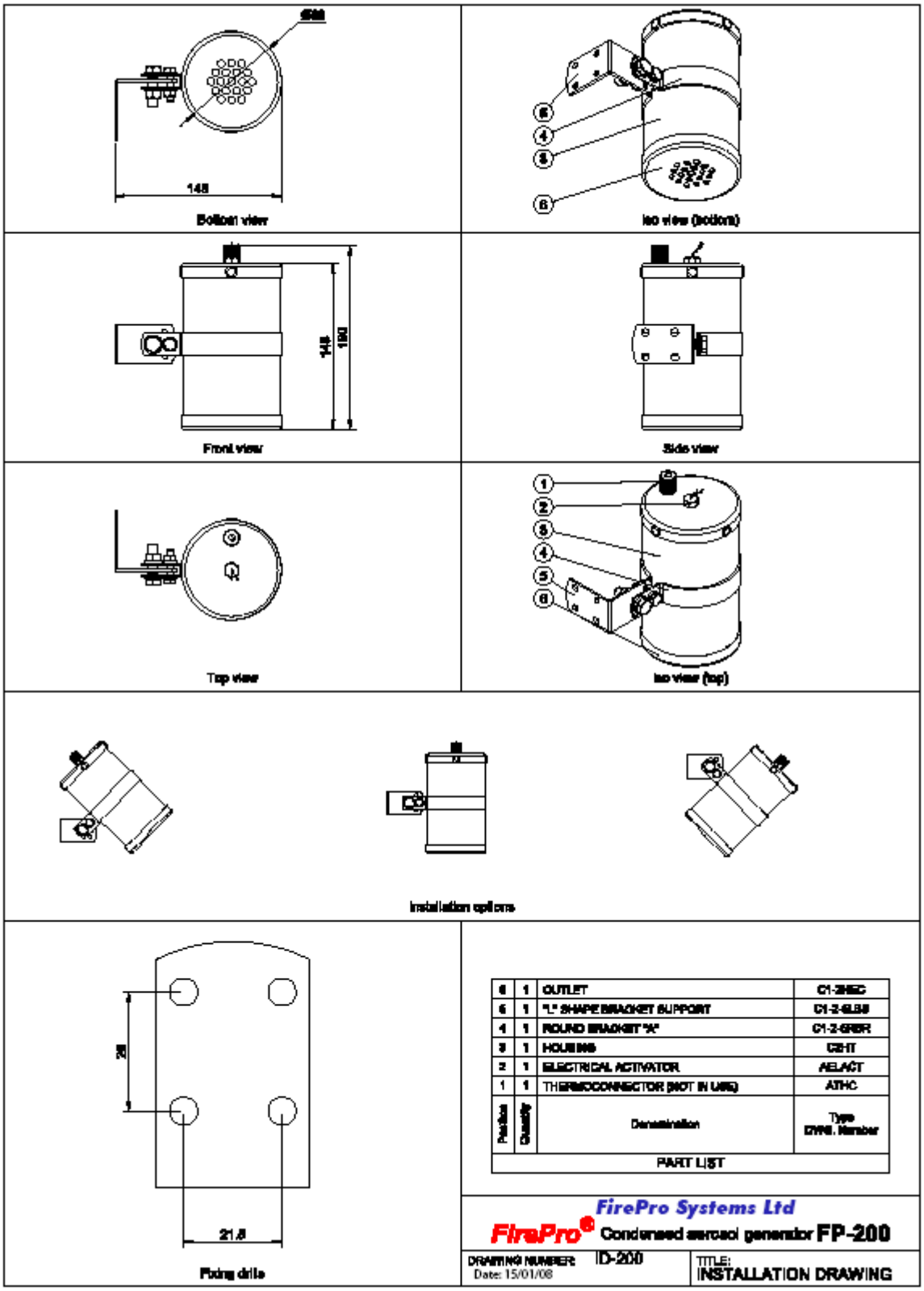
	explosion	harmful pressure wave arising from very rapid combustion	14
	explosive mixture	ratio of mixture of oxygen and flammable substance	14
	extinguishing system	system for limiting and/or extinguishing fires	
	extinguishing zone	specific section of total extinguishing installation	49
F	fire class	subdivision of flammable substances and extinguishing agent to be used	13
	fire detection and fire alarm control unit	computer that converts detection into an alarm	51
	fire brigade panel	panel on which the fire brigade can see where the fire alarm is located	51
	formula	succession of the calculation steps to be taken	33
	FP	abbreviation for FirePro brand name	15
	function retention cabling	power cables that retain their functionality for a given period of time on heating	54
	fuse	link in the chain that prevents the flow of current in the event of a short circuit	41
G	glow bridge	wire that heats up when current flows through it	43
	G T-C	type of thermocord	44
	guide	steps to be followed given in advance	33
H	Halon	extinguishing agent that may no longer be used	
	Health and safety information sheet	information sheets with guidelines for safe working	18
	heat absorbing	part of extinguisher in which the heat that has developed is absorbed	19
	hydrocarbons	substances distilled from oil	17
I	installation attestation	written declaration of functionality from the fire detection company	56
	installation certificate	certificate that is issued following inspection and approval of installation	53
J			
K	K2CO3	chemical abbreviation	60
	KOH	chemical abbreviation	6
L	leakage losses	amount of extinguishing agent that can flow away through openings	35
	logbook	handbook for day-to-day manager and installer of the installation	56
M	m	metres (size indication)	5
	m³	cubic metres (size indication)	15
	manuals (M)	type of extinguisher that are activated by hand	48
	micrometre	unit indication for particle size	5
	mm	millimetres (size indication)	21
	model	properties laid down in clear designation	21
	MSDS	safety summary per element properties in the product	62
N	nanometre	unit indication for particle size	5
	NCP	National Centre for Prevention	55
	NEN	European Standard translated into and according to Dutch standards	2
	nominal	weighed amount of extinguishing agent for discharge	33
	nozzle	head that can be placed on extinguisher for better diffusion of the extinguishing agent	21
	NPR-7910	directive for construction, classification and maintenance of storage of dangerous goods	16
O	operating temperature	temperature at which a reaction will occur	48

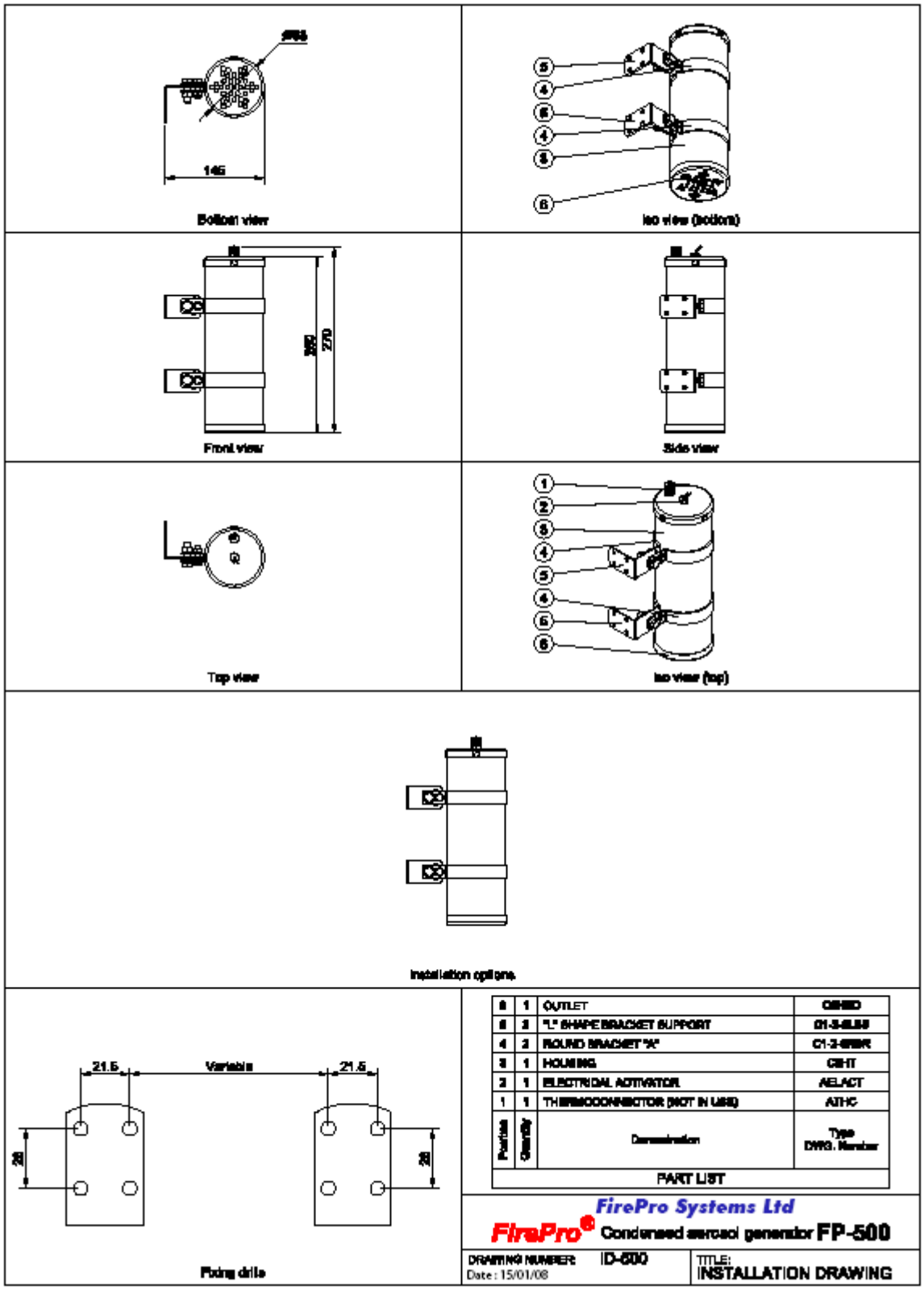
P	peak voltage	electrical voltage level that can be reached	45
	potassium	chemical element	6
	performance requirement	requirements that an installation must meet	13
	protection time	time in which the extinguishing agent continues its action according to calculation	33
Q			
R	residue	substance that remains following an activation	60
S	safety factor	extra amount of extinguishing agent for taking care of uncertain factors	33
	SBK	Solid Bound Compound is the denomination of the solid extinguishing chemical compound in the extinguisher	19
	schedule of requirements	schedule of requirements that is drawn up for theinstallation in advance	13
	self-activation temperature	temperature at which the unit puts itself into operation	19
	short circuit	unwanted flow of current that disturbs proper operation	41
	siting	determination of location and amount of extinguishing agent by survey	2
	Slow whoop	visual and acoustic signal emitter for alarm	51
	sol	colloidal solution	5
	S T-C	type of thermocord	49
T	thermocord	heat conducting cord that transports heat to extinguisher	7
	thermocord connector	connecting point for connection of thermocord to fire extinguisher	49
	thermodifferential	detectors that react to heat differences in the event of fire	50
	thermomaximal	detectors that react to set temperature in the event of fire	50
	transmission	message from control unit via network to an alarm post (e. g. fire brigade)	13
U	unit	collective term for extinguisher in which all the elements are present	18
V			
W	WBDBO	abbreviation factor time for remaining intact of wall parts and/or walls (Wall-Fire-Penetration-Fire-Flashover)	35
	Working Conditions Act	Dutch health and safety at work legislation	18
X			
Y			
Z			

Appendix 1

FirePro Aerosol Generators Installation Drawings


Bottom view
Iso view (bottom)
115
180
Front view
Side view
148
Top view
Iso view (top)
Installation options
22
Fixing drills
6 1 OUTLET C1-2 HEC
5 1 "L" SHAPE BRACKET SUPPORT C1-2-SUS
4 1 ROUND BRACKET "A" C1-2-SHR
3 1 HOUSING C1HT
2 1 ELECTRICAL ACTIVATOR AELACT
1 1 THERMOCONNECTOR (NOT IN USE) ATHC
Position
Quantity
Denomination
Type
DWG. Number
PART LIST
FirePro Systems Ltd
FirePro® Condensed aerosol generator FP-100
DRAWING NUMBER: ID-100
Date : 15/01/08
TITLE:
INSTALLATION DRAWING


148
Bottom view
Iso view (bottom)
148
193
Front view
Side view
Top view
Iso view (top)
Installation options
25
21.8
Fixing drills
6 1 OUTLET C1-2HSC
5 1 "L" SHAPE BRACKET SUPPORT C1-2-SLSS
4 1 ROUND BRACKET "A" C1-2-SRBR
3 1 HOUSING C2HT
2 1 ELECTRICAL ACTIVATOR AELACT
1 1 THERMOCONNECTOR (NOT IN USE) ATHC
Position Quantity Denomination Type DWG. Number
PART LIST
FirePro Systems Ltd
FirePro® Condensed aerosol generator FP-200
DRAWING NUMBER: ID-200
Date: 15/01/08
TITLE:
INSTALLATION DRAWING



Parts	Quantity	Denomination	Type DWG. Number
6	1	OUTLET	OSHID
5	2	"L" SHAPE BRACKET SUPPORT	01-3-SLS3
4	2	ROUND BRACKET "A"	C1-3-SRA
3	1	HOUSING	CSHT
2	1	ELECTRICAL ACTIVATOR	AELACT
1	1	THERMOCONNECTOR (NOT IN USE)	ATHC

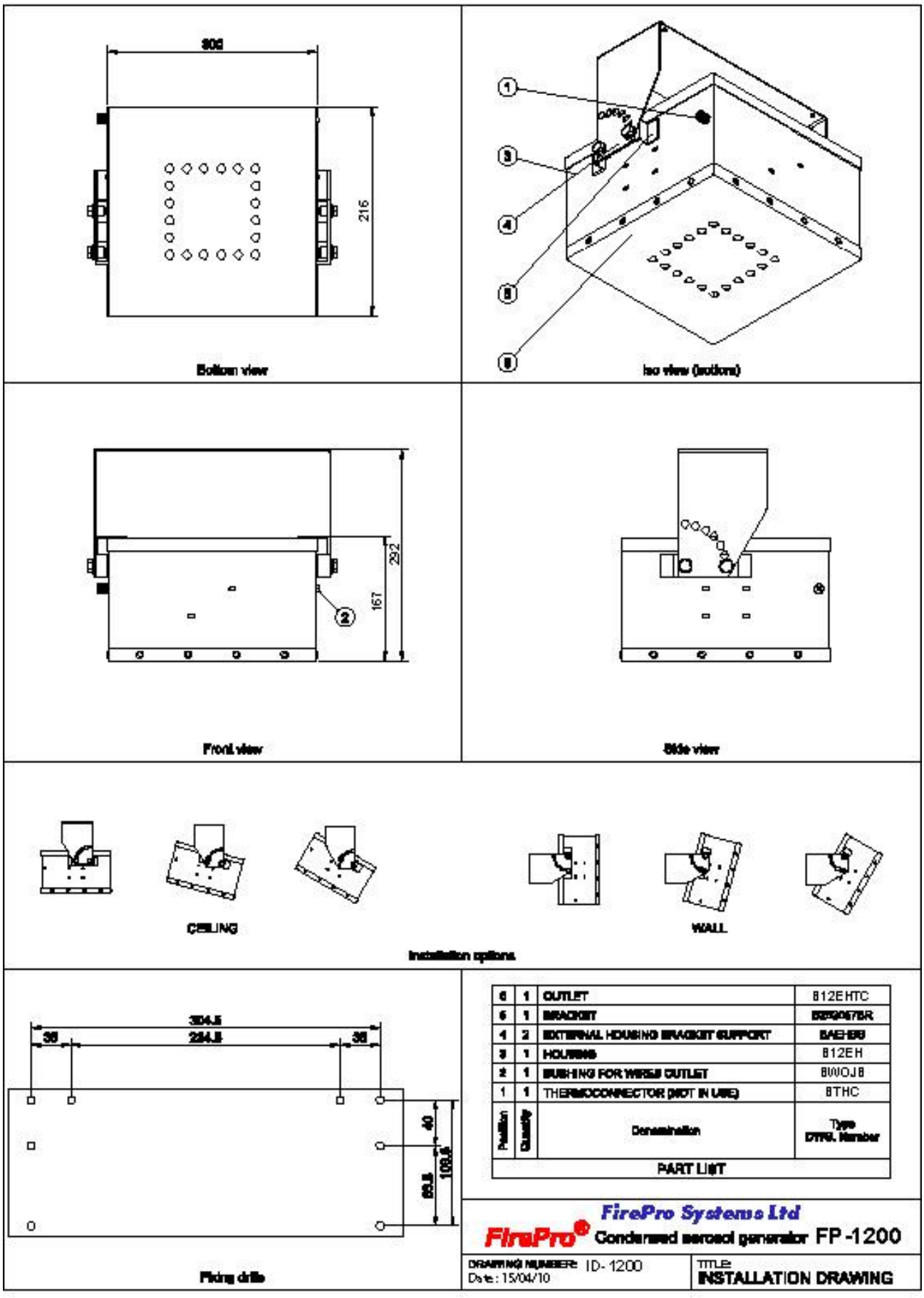
PART LIST

FirePro Systems Ltd

FirePro® Condensed aerosol generator FP-500

DRAWING NUMBER: ID-500
Date: 15/01/08

TITLE: INSTALLATION DRAWING



Position	Quantity	Denomination	Type DWG. Number
6	1	OUTLET	B12EHTC
5	1	BRACKET	B2EQ57BR
4	2	EXTERNAL HOUSING BRACKET SUPPORT	BAEHSS
3	1	HOUSING	B12EH
2	1	BUSHING FOR WIRES OUTLET	BWOJB
1	1	THERMOCONNECTOR (NOT IN USE)	BTHC

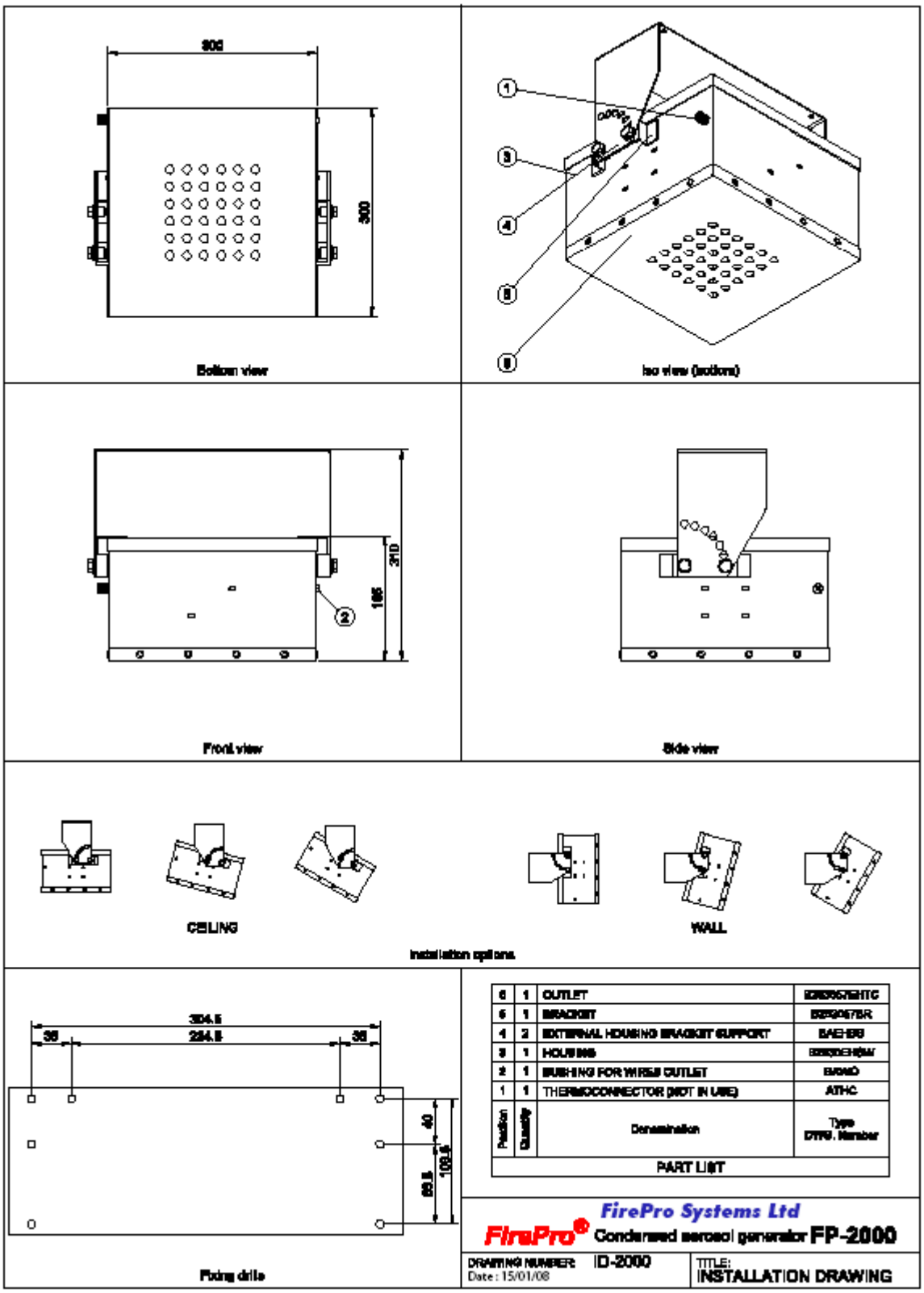
PART LIST

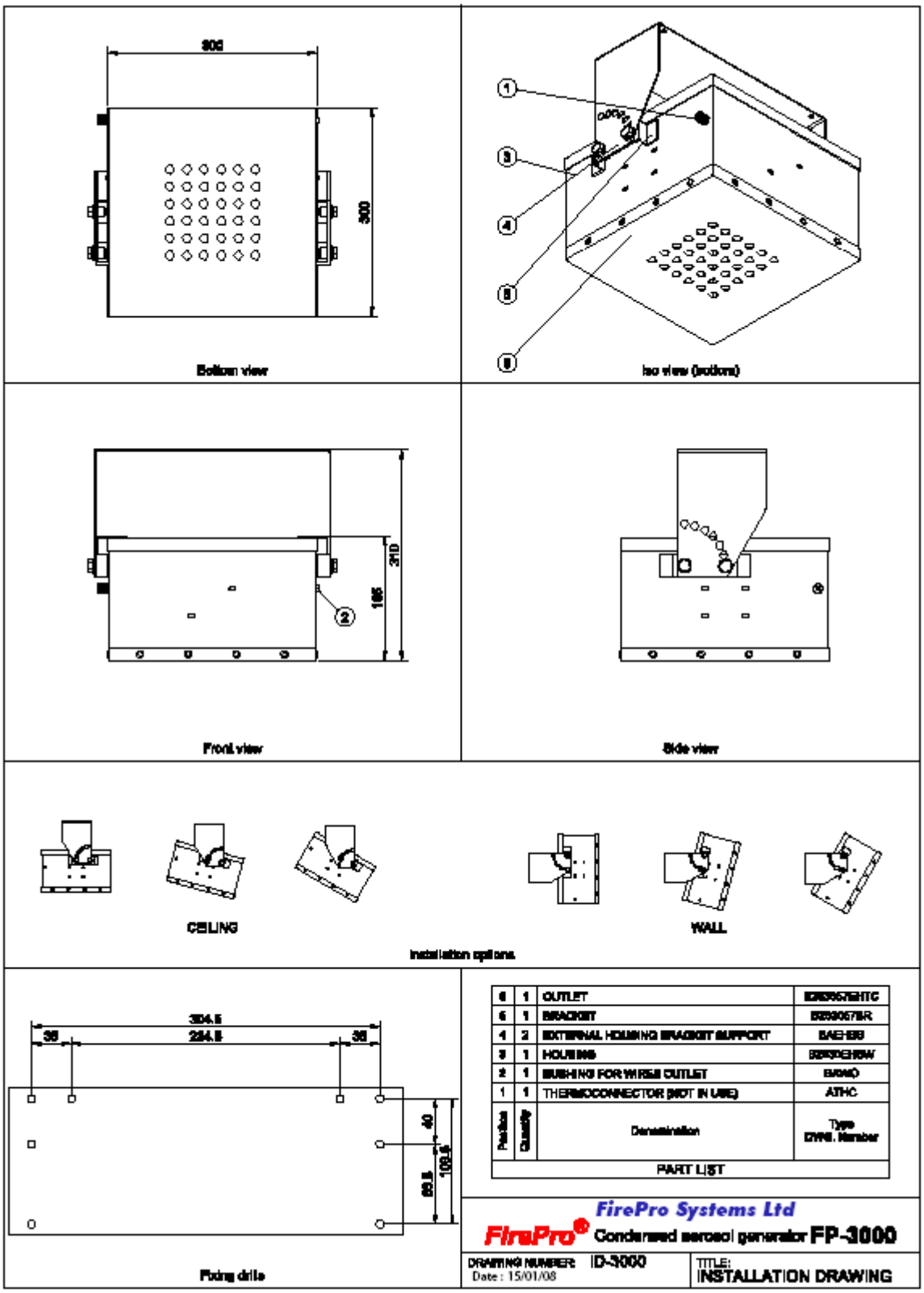
FirePro Systems Ltd

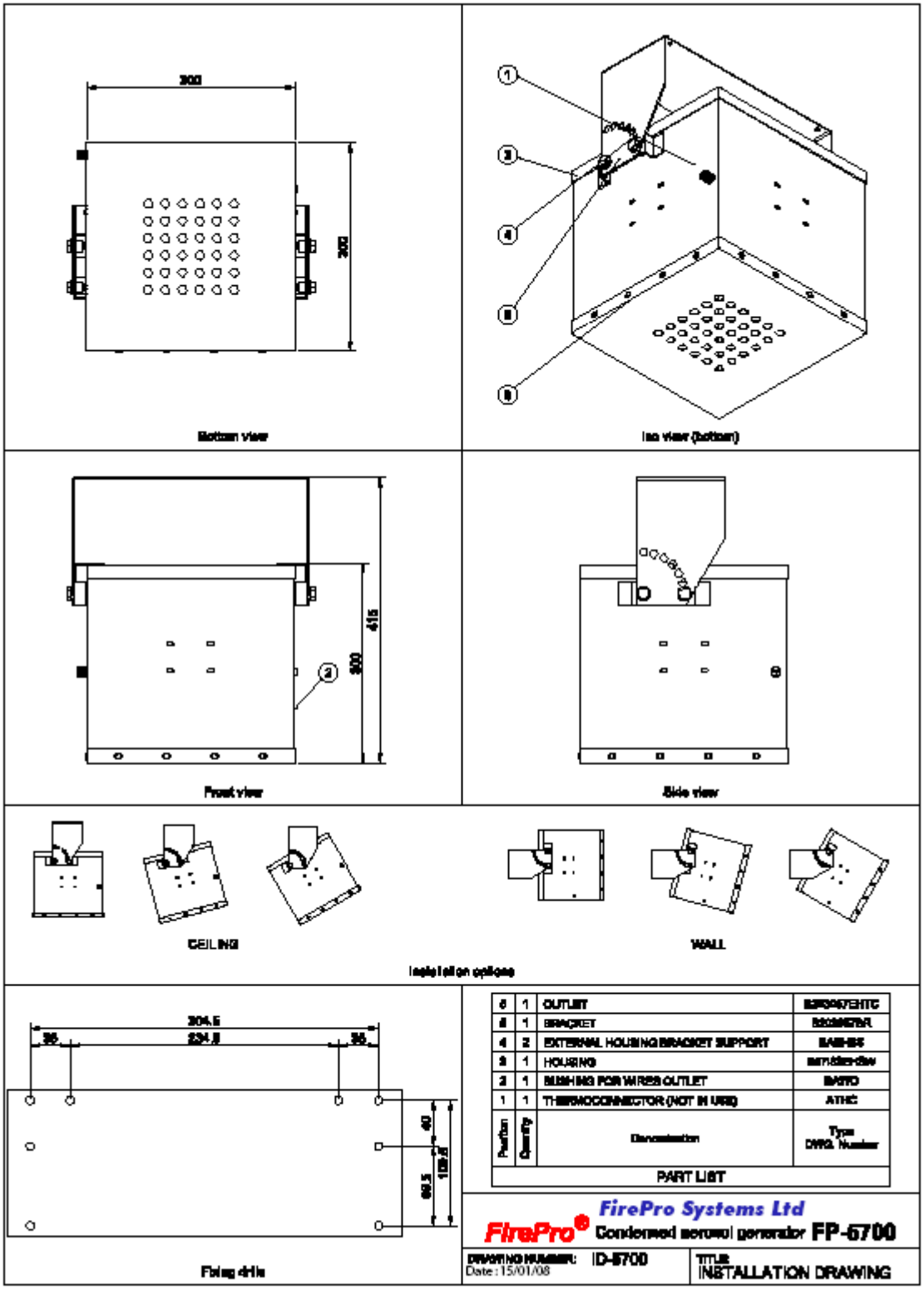
FirePro® Condensed aerosol generator FP-1200

DRAWING NUMBER: ID-1200
Date: 15/04/10

TITLE: INSTALLATION DRAWING

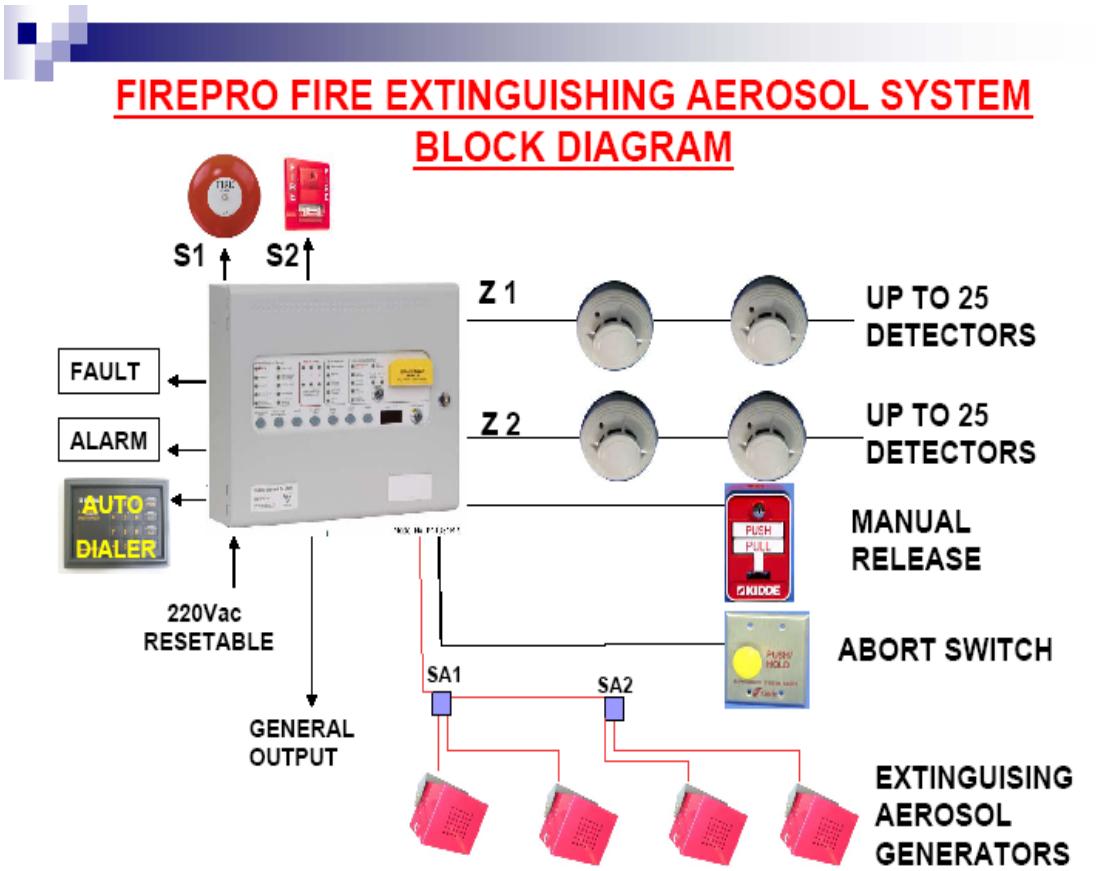

300
300
Bottom view
Iso view (sections)
310
185
2
Front view
Side view
CEILING
WALL
Installation options
304.5
38
228.5
38
40
100.5
69.5
Fixing drills
6 1 OUTLET
5 1 BRACKET
4 2 EXTERNAL HOUSING BRACKET SUPPORT
3 1 HOUSING
2 1 BUSHING FOR WIRES OUTLET
1 1 THERMOCONNECTOR (NOT IN USE) ATHC
Position
Quantity
Denomination
Type DWG. Number
PART LIST
FirePro Systems Ltd
FirePro® Condensed aerosol generator FP-2000
DRAWING NUMBER: ID-2000
Date : 15/01/08
TITLE:
INSTALLATION DRAWING


300
300
Bottom view
Iso view (bottom)
310
185
2
Front view
Side view
CEILING
WALL
Installation options
304.5
38
228.5
38
40
100.5
69.5
Fixing drills
6 1 OUTLET
5 1 BRACKET
4 2 EXTERNAL HOUSING BRACKET SUPPORT
3 1 HOUSING
2 1 BUSHING FOR WIRE OUTLET
1 1 THERMOCONNECTOR (NOT IN USE)
Position
Quantity
Denomination
Type
DWG. Number
PART LIST
FirePro Systems Ltd
FirePro®
Condensed aerosol generator FP-3000
DRAWING NUMBER: ID-3000
Date : 15/01/08
TITLE:
INSTALLATION DRAWING


300
300
Bottom view
Iso view (bottom)
415
300
Front view
Side view
CEILING
WALL
Installation options
304.5
234.5
35
35
40
100.5
60.5
Fixing drills
PART LIST
FirePro Systems Ltd
Condensed aerosol generator FP-5700
DRAWING NUMBER: ID-5700
Date : 15/01/08
TITLE
INSTALLATION DRAWING

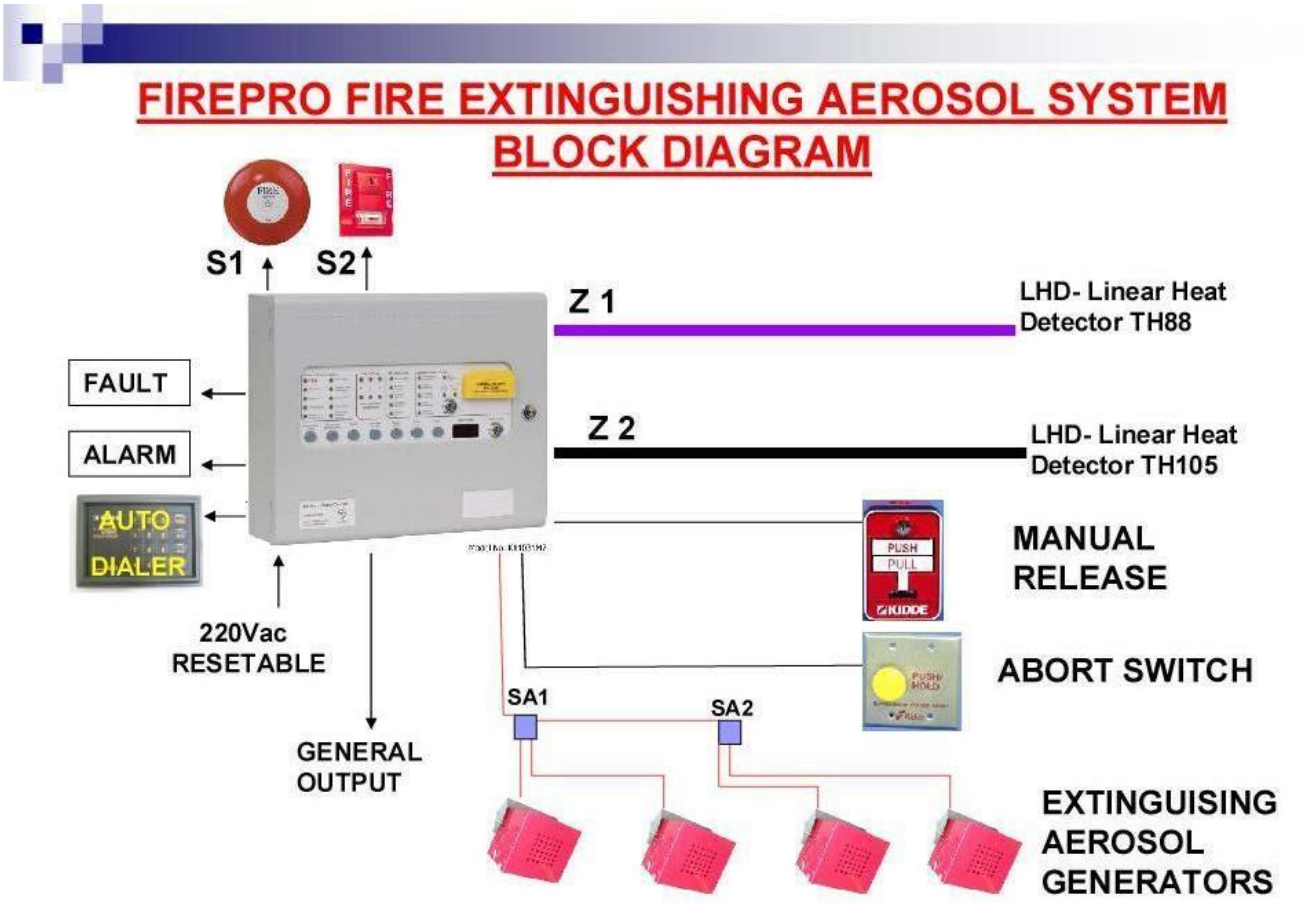
Appendix 2

FirePro Fire Extinguishing Aerosol System Block Diagram (using Smoke and Rate of Rise of Heat Detectors)



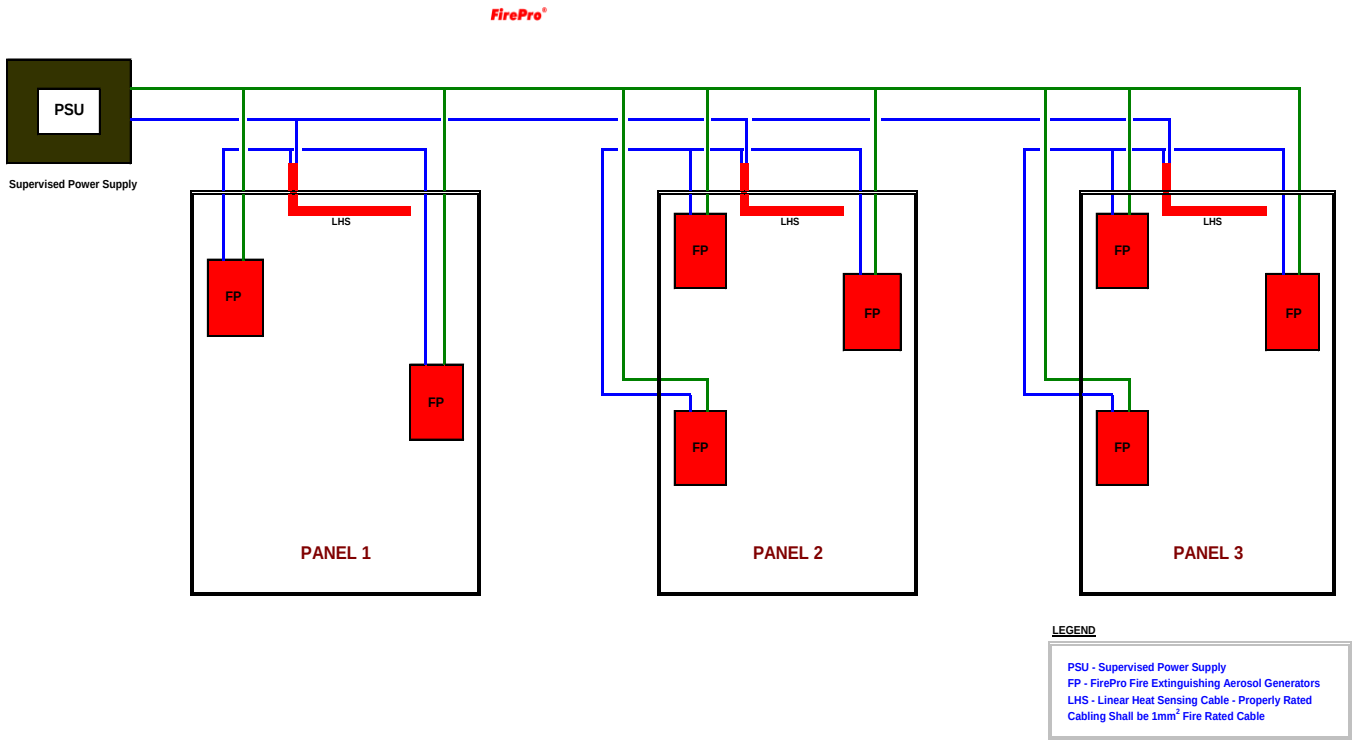
Appendix 3

FirePro Fire Extinguishing Aerosol System Block Diagram (using Linear Heat Detector)



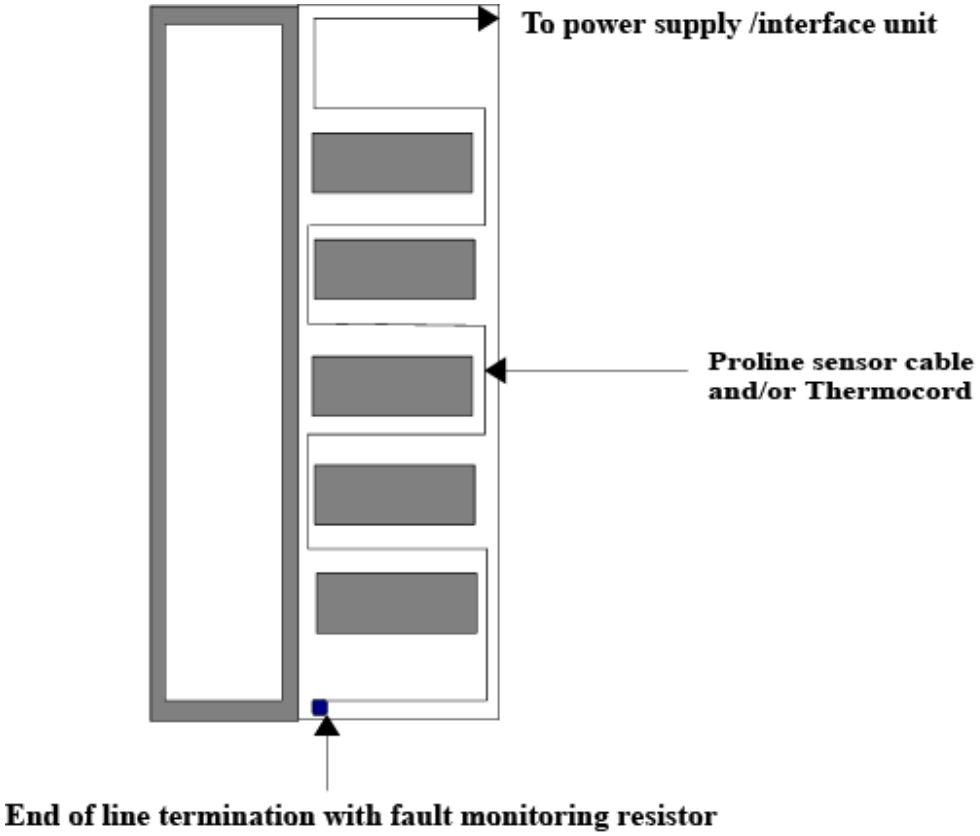
Appendix 4

FirePro Multiple Panel Enclosure Protection



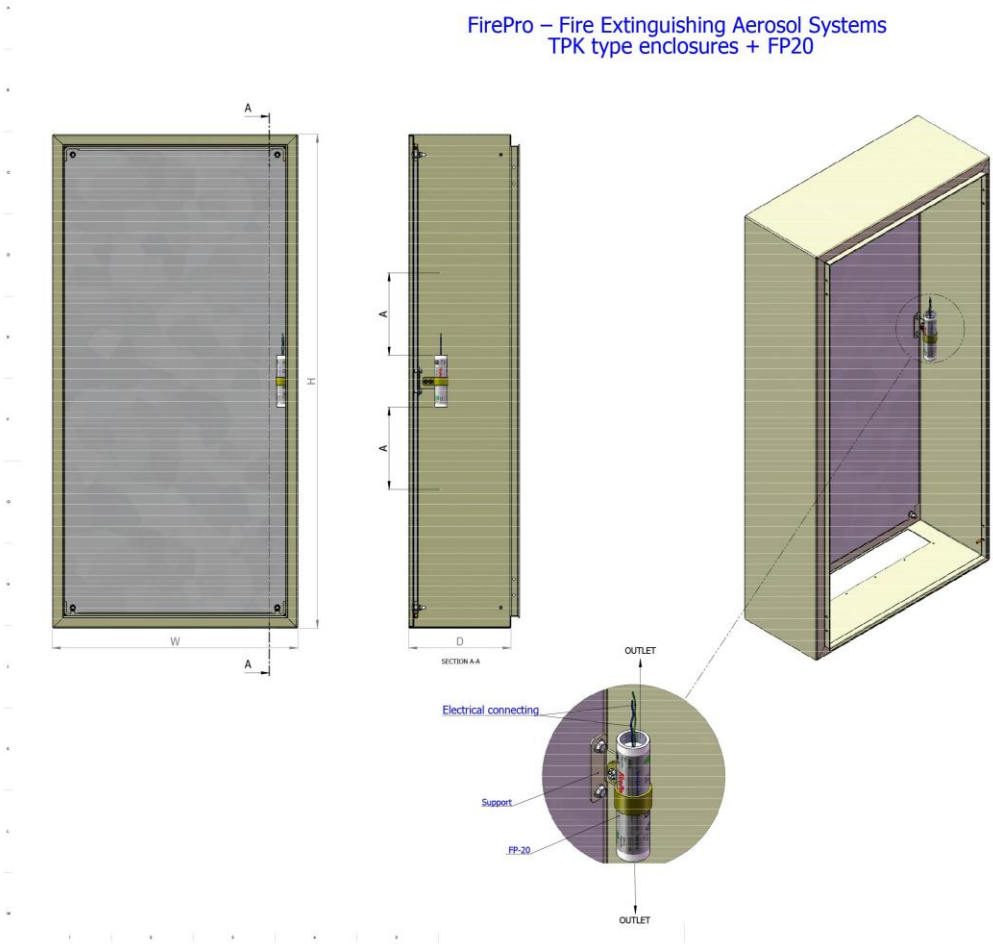
Appendix 5

Routing of FirePro Thermocord and/or Linear Heat Detector (e. g., in electrical cabinet)


To power supply /interface unit
Proline sensor cable and/or Thermocord
End of line termination with fault monitoring resistor

Appendix 6

Positioning of FirePro FP-20E/FP-20S Generator in TPK Type Enclosures

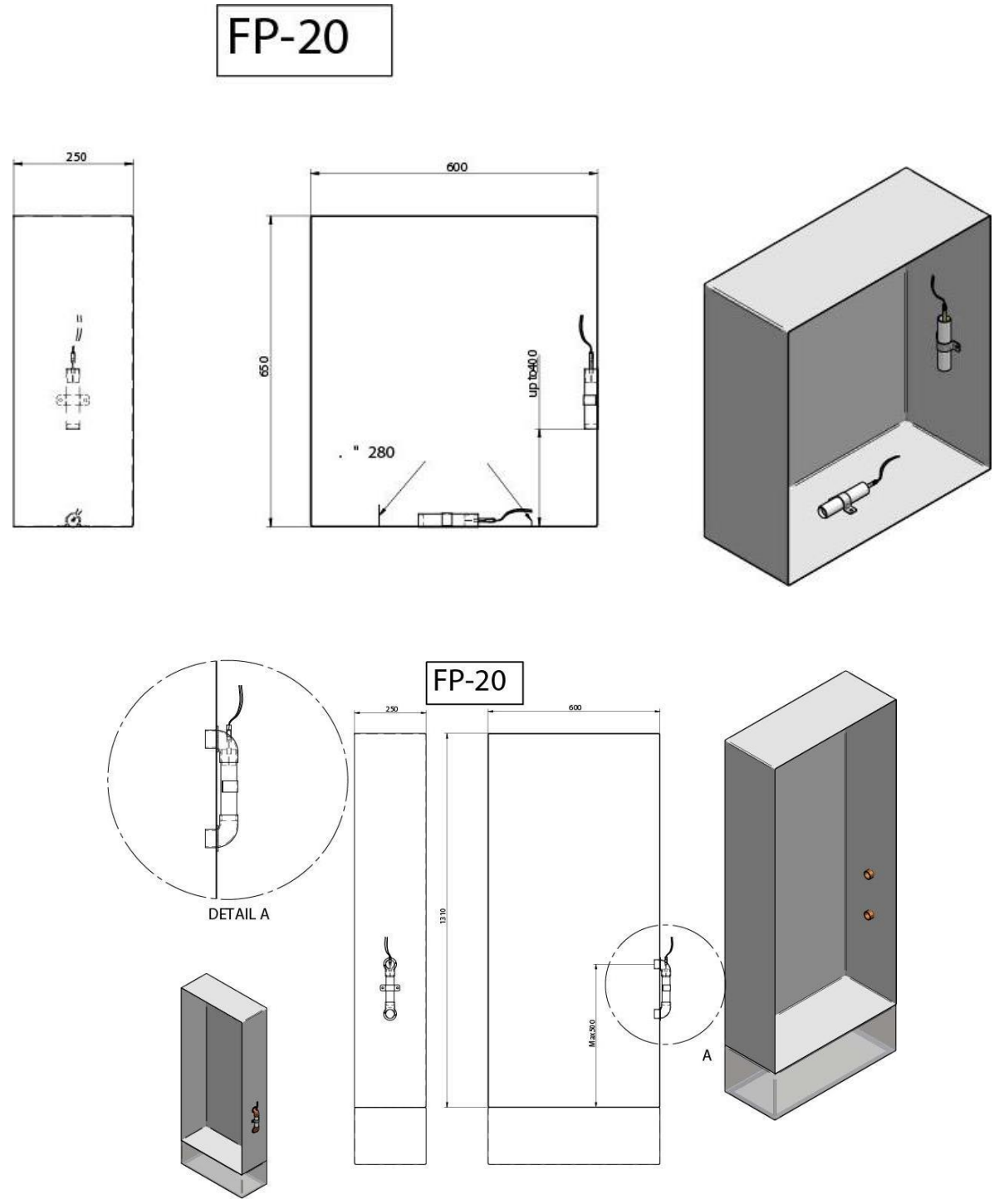


Note:
1. A=200 - The minimal distance up to an inflammable material
2. AEROSOL FP-20 should be installed in TPK enclosures types as mentioned in the following table:

ITEM NO.	CATALOG NUMBER	Height (H)	Width (W)	Depth (D)
1	TPK302515	300	250	150
2	TPK303015	300	300	150
3	TPK303020	300	300	200
4	TPK403015	400	300	150
5	TPK403020	400	300	200
6	TPK404020	400	400	200
7	TPK404025	400	400	250
8	TPK406025	400	600	250
9	TPK408025	400	800	250
10	TPK504020	500	400	200
11	TPK504025	500	400	250
12	TPK604020	600	400	200
13	TPK604025	600	400	250
14	TPK605020	600	500	200
15	TPK605025	600	500	250
16	TPK606020	600	600	200
17	TPK606025	600	600	250
18	TPK606035	600	600	350
19	TPK705020	700	500	200
20	TPK705025	700	500	250
21	TPK705035	700	500	350
22	TPK805020	800	500	200
23	TPK805025	800	500	250
24	TPK805035	800	500	350
25	TPK806020	800	600	200
26	TPK806025	800	600	250
27	TPK806035	800	600	350
28	TPK808025	800	800	250
29	TPK808035	800	800	350
30	TPK906025	900	600	250
31	TPK906035	900	600	350
32	TPK1006025	1000	600	250
33	TPK1008025	1000	800	250
34	TPK1206025	1200	600	250

Appendix 7

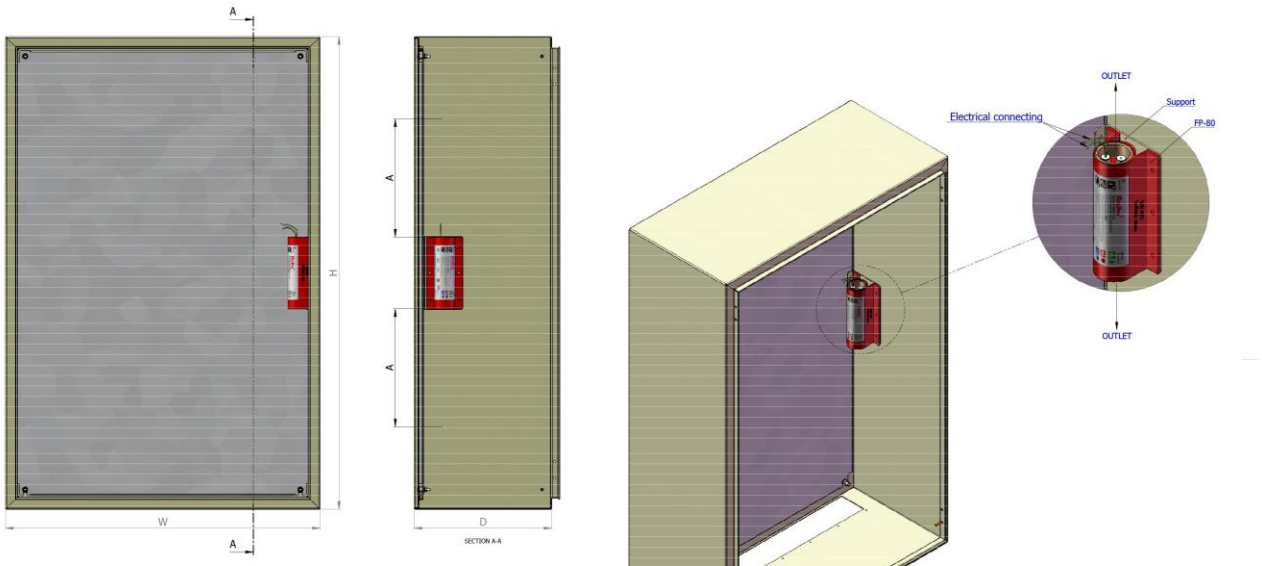
Positioning of FirePro FP-20E/FP-20S Generator in 100/200 lt Cabinets



Appendix 8

Positioning of FirePro FP-80/FP-80S Generator in 100/200 lt Cabinets

FirePro – Fire Extinguishing Aerosol Systems
TPK type enclosures + FP80

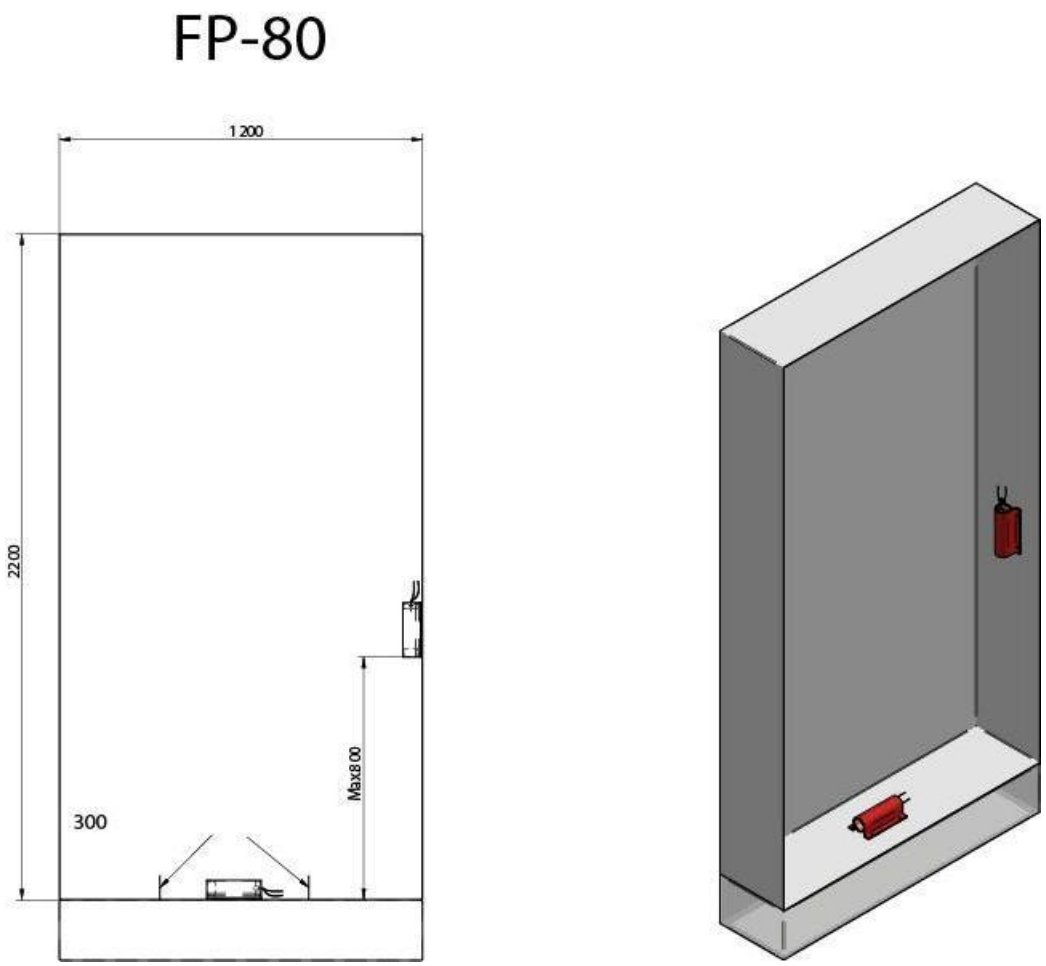


Note:
1. A=300 - The minimal distance up to an inflammable material
2. AEROSOL FP-80 should be installed in TPK enclosures types as mentioned in the following table:

ITEM NO.	CATALOG NO.	Height (H)	Width (W)	Depth (D)
1	TPK1006035	1000	600	350
2	TPK1008035	1000	800	350
3	TPK1206035	1200	600	350
4	TPK1208025	1200	800	250
5	TPK1208035	1200	800	350

Appendix 9

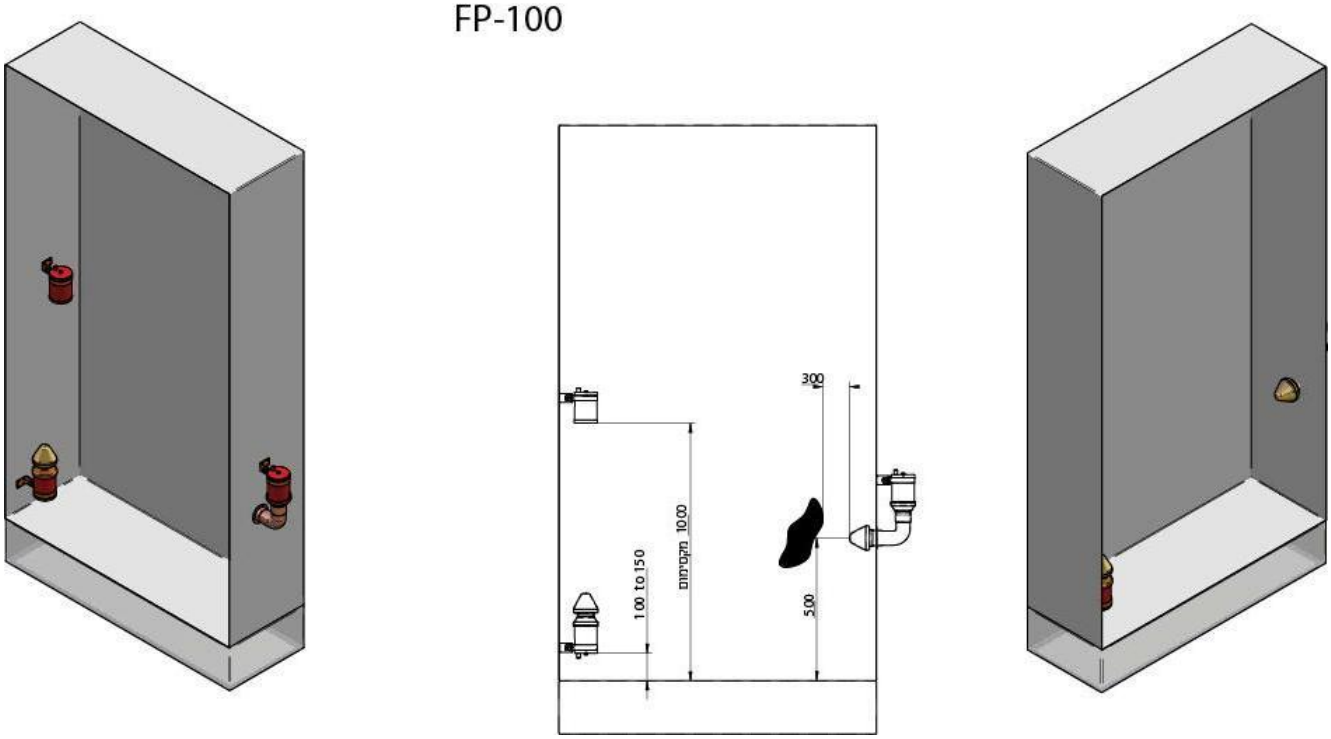
Positioning of FirePro FP-80/FP-80S Generator in 800 lt Cabinets



Appendix 10

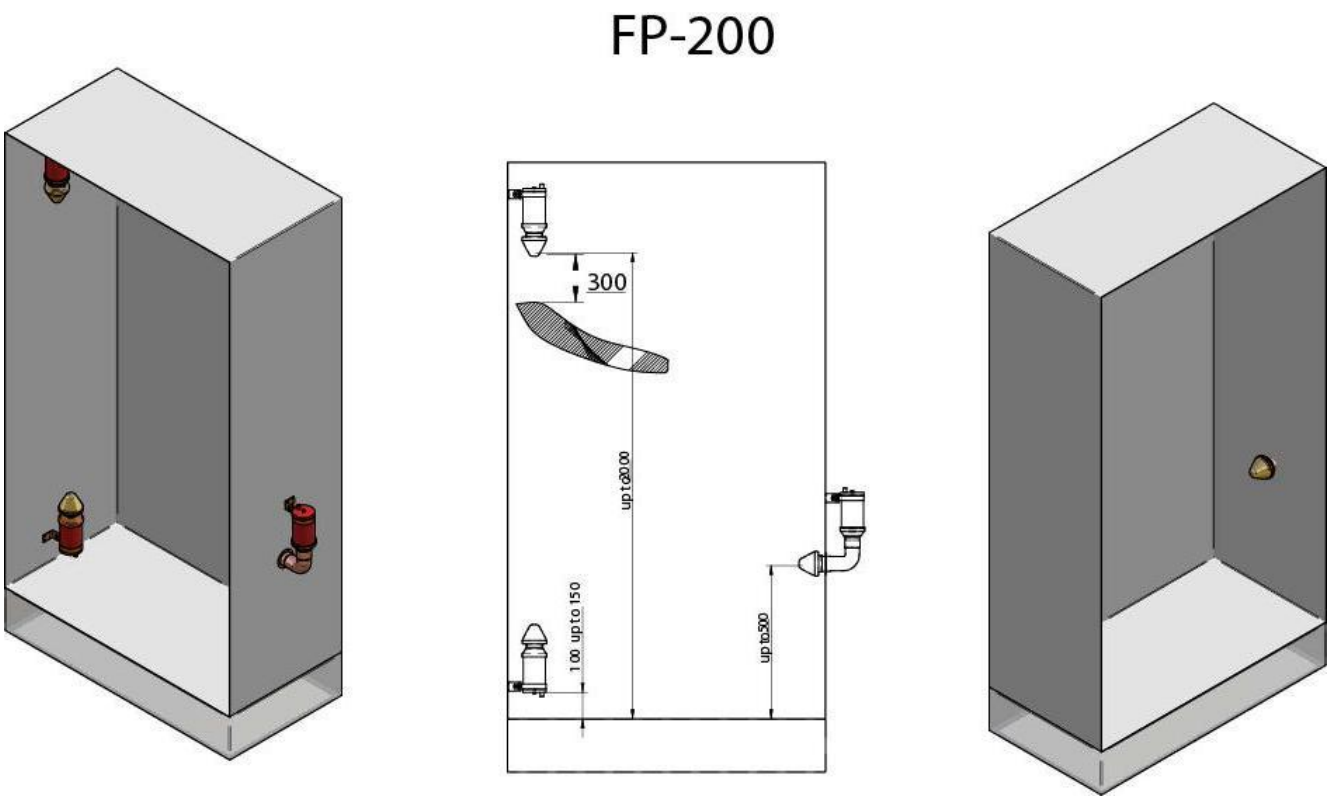
Positioning of FirePro FP-100S Generator in 1000 lt Cabinets

FP-100



Appendix 11

Positioning of FirePro FP-200S Generator in 2000 lt Cabinets



Appendix 12

Positioning of FirePro FP-500S Generator in 5000 lt Cabinets